



GRANDISON BROOK FLOOD ALEVATION SCHEME

GROUND INVESTIGATION FACTUAL REPORT

**Report No.
Q00560/FR.01**

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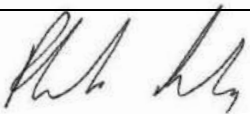
GROUND INVESTIGATION FACTUAL REPORT

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<i>Disclaimer: Quantum Geotechnic Limited has prepared this report in accordance with the instructions of the above named Client for their sole and specific use. Any third parties who may use the information contained herein do so at their own risk.</i> Quantum Geotechnic Ltd, Plas Newydd, Llanedi, Swansea, SA4 0FQ. T: 01554 744880 E: enquiries@quantumgeotech.co.uk Website: http://www.quantumgeotech.co.uk/				

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0.0 FOREWORD

The following Conditions and Notes on Site Investigation Procedures should be read in conjunction with this report.

0.1 General

Recommendations made and opinions expressed in the report are based on the strata observed in the excavations, together with the results of site and laboratory tests. No responsibility can be held for conditions which have not been revealed by the Exploratory Holes or which occur between Exploratory Holes. Whilst the report may suggest the likely configuration of strata, both between Exploratory Holes and below the maximum depth of investigation, this is only indicative and liability cannot be accepted for its accuracy.

Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction below or close to the site.

0.2 Investigation Procedures

Rotary Percussive (dynamic sampled) Boreholes, Hand and Machine excavated pitting techniques for ground investigation have been employed within the project. All Exploratory Hole operations, sampling and logging of soils, rocks and in-situ testing complies with the recommendations of the British Code of Practice BS 5930: 2015 'Site Investigations', British Code of Practice BS 10175: A2:2017 'Investigation of Potentially Contaminated Sites' and BS 1377: 1990, 'Methods of Test for Soils for Engineering Purposes'.

0.3 Routine Sampling

Representative bulk disturbed and environmental samples of the different strata are taken following completion of logging. These samples are sealed and labelled in clear plastic bags and 2kg plastic tubs. Soil samples obtained for environmental testing are sampled and sealed in borosilicate amber jars or in specialist vessels where required. Ground Water samples were sampled and sealed in borosilicate amber bottles or in specialist vessels where required. All samples are returned from site to QGL's laboratory for controlled storage within 24 hours of sampling to await test scheduling/requirements.

0.4 In-Situ Testing, Surveying & Instrumentation

In-situ testing comprised:

- Standard Penetration Testing within Boreholes (SPT)
- All exploratory hole locations to be surveyed for location and elevation.
- GPR Survey
- PID testing

0.5 Groundwater

Where possible, the depth of entry of any influx of groundwater is recorded during the course of excavation or boring operations. The rate of inflow into the excavation or borehole is monitored during the course of the excavation or during boring procedures. Upon encountering any water strikes, work is temporarily halted and the water levels monitored for a standard twenty-minute period recording the change in water level at the end of the twenty minutes.

Groundwater conditions observed in the excavations are those appertaining to the period of investigation. It should be noted, however, that groundwater levels are subject to diurnal, seasonal and climatic variations and can also be affected by drainage conditions or other causes.

0.6 Retention of Samples

After satisfactory completion of all the scheduled laboratory tests on any sample, the remaining material is discarded. Further to notifying the Engineer/ Client with one week's notice all soil and/or rock samples not tested will be discarded 28 days after submission of the approved final report.

1.0 INTRODUCTION

1.1 General

Upon the instructions of Atkins, the scheme Engineer / Investigation Supervisor / Client, Quantum Geotechnic Limited (QGL) was commissioned to undertake a ground investigation for the proposed flood alleviation scheme for Grandison Brook, Briton Ferry.

The siteworks were carried out between, 5th – 13th July, 29th July – 19th August, 18th October and 15th November 2021.

This report presents a factual account of the fieldwork carried out, includes descriptions of the strata encountered, available groundwater observations, details of in-situ testing undertaken, location of services encountered and provides results of subsequent laboratory testing of samples obtained from the investigation.

General notes on the techniques employed by QGL are described in the Foreword together with the limitations inherent in carrying out site investigation work.

1.2 Purpose of Ground Investigation

The purpose of the ground investigation is to determine the existing ground conditions on the site, together with details and location of services along the proposed culvert route to allow the design of the proposed culvert improvement works.

The purpose of the proposed work is to improve the hydraulic conveyance capacity of the existing water course whilst maintaining the current alignment.

The work shall comprise the construction of a new inlet structure to accommodate a new, larger culvert, the construction of 400m of a new 900mm internal diameter culvert and the connection between the new culvert and the existing surface water drainage and downstream 1050mm diameter culvert.

1.3 Initial Scope of Work

The aim of the ground investigation is to:

- Determine the nature and thickness of any Made Ground;
- Determine the nature and thickness of the Superficial Deposits;
- Determine the depth to Bedrock and thickness of any weathered horizon;
- Recover suitable samples for geotechnical; and geo-environmental laboratory testing;
- Locate presence, size and depth of services on site.

The initial scope of works entails the following:

- 6 no. Percussive Rotary Boreholes
- 5 no. Hand Excavated Pits / Trenches
- 9 no. Machine Excavated Trial Pits
- In-Situ Testing
- PAS-B and GPR Survey to identify underground services.

General

- Geotechnical and Geo-environmental Laboratory Testing.
- Provide a factual report detailing the investigation.

General notes on the techniques employed by Quantum are described in the Foreword together with the limitations inherent in carrying out ground investigation work.

2.0 SITE DETAIL

2.1 Site Description

The site is located in the Pantyrheol area of Briton Ferry, Neath, Wales and passes through residential areas, sports fields, Ysgol Carreg Hir, across the A474 and through railway land. The site is bounded by Briton Ferry Llansawel AFC football pitch and some vacant fields in the north. Briton Ferry Llansawel AFC football pitch, Parc Jersey Park and Ynysymaerdy road lie to the south, and part of the site is interspersed with residential dwellings and some vacant fields to the east. Old Road bounds the site to the northwest and a housing development off of Manor Way bounds it to the southeast

The site is located at Ordnance Survey National Grid reference 274680E and 195180N.

Where necessary trial pits, hand pits, boreholes and a GPR Survey were carried out under traffic management supplied by Amberon as QGLs approved traffic management supplier. These areas were re-instated to NRSWA standard.

Access to GBBH04, GBTP04, GBTP10 and GBTP10A is via Network Rail owned land and assets which required Network rail supervision. In addition, vegetation clearance was undertaken to allow access to these exploratory holes.

Due to access restrictions relating to current site usage, GBBH06, GBTP07, GBTP08 and GBTP09 originally scheduled within the grounds of Ysgol Carreg Hir Primary School were cancelled by the Investigation Supervisor.

Trial Pits GBTP10 and GBTP10A were additional trial pits instructed by the Investigation Supervisor.

QGL were the appointed Contractor for the works, under order number 5192793-001 issued on 21st June 2021. The works were commissioned in order to establish general ground conditions and locate live services across the proposed route of a new culvert.

The general extent of the site is shown in Figure 1 in Appendix I.

2.2 Statutory Service Information

All service information was held by the client with the relevant plans and information made available to QGL prior to commencement of the intrusive works.

A permit to excavate was issued by QGL for all exploratory holes. Standard QGL procedures for breaking ground were followed and all areas were scanned using a cable avoidance tool. A hand dug trial pit was

excavated to 1.2m prior to commencement of drilling where services may be at risk. All hand excavation was undertaken using insulated digging tools.

GPR surveys were undertaken at specified locations to help establish the locations and depths of known buried services. The Survey was undertaken by Intersect Surveys. Following completion of the GPR surveys, hand excavated trial pits / trenches were undertaken to prove the location of buried services.

2.3 Published Geology

Details of the published and inferred geology of the site are summarised as followed:

The British Geological Survey (BGS) sheet 1:50,000 247 (Swansea) indicates

Superficial Deposits

The site is predominantly underlain by Glacial Till deposits. Tidal Flat deposits are mapped along the northern boundary of the site.

Bedrock Geology

The site is mapped to be underlain by interbedded sandstone, siltstone and mudstone with coal seams of the Hughes Member and Brithdir Member.

Client Supplied Information

“Ground Investigation information for Cwrt Sart Comprehensive School, located approximately 200m north west of the site has been made available by Neath Port Talbot County Borough Council. The ground investigation found Made Ground between 0.7m and 1.45m thick comprising sandy gravel with low to medium cobble content, soft clay and peat between 0.3m and 2.15m thick overlying firm to stiff sandy gravelly clay and medium dense sandy gravel with low to medium cobble content with thin lenses of sand..... Groundwater was recorded in two boreholes at 1.5m and 2.3m”.

3.0 FIELDWORK

3.1 General

A summary of the works completed and covered by this report are given below:

- 5 No. Rotary Percussive (dynamic sampled) boreholes. (GBBH01- GBBH05, note GBBH06 not undertaken due to access restrictions)
- 1 No. Super Heavy Dynamic Probe
- 5 No. Hand Excavated Trial Pits (GBHP01 – GBHP05, note GBHP01A & GBHP05A undertaken in two sections)
- 8 No. Machine Excavated Trial Pits (GBTP01 – GBTP06, GBTP10 & GBTP10A, note GBTP07 – GBTP09 not undertaken due to access restrictions)
- In-situ testing and sampling.
- Post fieldwork groundwater and ground gas monitoring.
- GPR surveys at 5 No locations

Full time site supervision and attendance from QGL was undertaken on all aspects of the site works and subsequent reinstatement works of all exploratory hole locations. Reinstatement of the exploratory holes within the highway was undertaken in accordance with NRSWA requirements. All service plans were held onsite, with all site personnel inducted by QGL and briefed of the pertinent Risk Assessments and Method Statements relating to the tasks to be undertaken.

The borehole locations were subject to a 1.2m deep service / utility inspection pit prior to any drilling. Also, each area of investigation was fully eCAT4+ ('Cable Avoidance Tool') scanned prior to breaking ground.

3.2 Exploratory Hole Locations

The exploratory hole locations were specified by Atkins and set out on site by QGL using the co-ordinates provided.

Exploratory Hole Location Plans are presented as Figure 2 in Appendix I and the Exploratory Hole co-ordinates and levels are detailed within Table 1.

Table 1: Exploratory Hole Co-Ordinates & Levels

Exploratory Hole	Easting	Northing	Height (mAOD)
GBBH01	274510.52	195251.98	11.19
GBBH02	274645.15	195180.25	15.61
GBBH03	274839.63	195105.88	22.9
GBBH04	274163.57	195578.11	4.99
GBBH05	274204.33	195557.24	5.79
GBDP05	274203.96	195558.19	5.67
GBHP01	274497.09	195262.51	10.88
GBHP01A	274510.32	195248.18	10.98
GBHP02	274807.19	195112.28	22.05
GBHP03	274264.72	195516.16	5.42
GBHP04	274297.33	195517.88	5.45
GBHP05	274303.273	195503.9	5.6
GBHP05A	274295.47	195511.51	5.58
GBTP01	274579.60	195215.24	13.66
GBTP02	274730.69	195151.13	18.15
GBTP03	274787.85	195124.03	20.52
GBTP04	274156.48	195612.41	4.88
GBTP05	274214.61	195550.81	5.47
GBTP06	274241.85	195528.64	5.09
GBTP10	274126.85	195592.95	4.88
GBTP10A	274128.68	195592.95	5.31

3.3 Boreholes

Percussive Rotary (Dynamic Sampling) Boreholes

A Commachio MC205 rubber track-mounted rotary drilling rig was used to progress the boreholes to depths of between 7.0 and 8.0mbgl (below ground level). Due to difficult drilling conditions ("blowing sands") GBBH05 did not reach the scheduled depth and dynamic probing was undertaken.

Each Borehole was drilled using dynamic sampling methods through the superficial deposits with an ODEX casing system. Dynamic Sampling is a technique whereby a hydraulically driven percussive hammer attached to the head of the drill rig mast is used to drive a 1.00m length, 101mm diameter, steel sampling tube through the soils to obtain undisturbed samples within 87mm core liner.

On encountering an obstruction or refusal of the Dynamic sample barrel, all boreholes were continued and kept open using an ODEX casing system of 115mm diameter. A combined air/mist flush was used to clear the hole of returns and debris.

In-situ testing was carried out in all boreholes (see section 3.4.1.).

Borehole RS-BH01 was located within the pavement and reinstated to NRSWA requirements on completion of the borehole.

Dynamic Probe GBDP05 was undertaken adjacent to GBBH05 as the GBBH05 was terminated at 7.0mbgl due to 'blowing sands'. Details of the Dynamic Probe methodology are presented within Section 3.6.4.

Details of the exploratory holes, including final depths in metres below ground level (mbgl) and SPT Hammer used are provided below in Table 2.

Table 2: Borehole details

Exploratory Hole ID	Drilling method	SPT Hammer Reference	Termination Depth (mbgl)	Notes/Reason for Termination
GBBH01	DS / ODEX	Q2	8.0	Scheduled Depth
GBBH02	DS / ODEX	Q2	8.0	Scheduled Depth
GBBH03	DS / ODEX	Q2	8.0	Scheduled Depth
GBBH04	DS / ODEX	Q3	8.0	Scheduled Depth
GBBH05	DS / ODEX	Q2	7.0	"Blowing Sand". Unable to progress
GBDP05	DP	TERRIER	10.1	Scheduled Depth. Undertaken adjacent to GBBH05

The Engineering Geologist's borehole logs are presented within Appendix II.

A 50mm dual gas and groundwater monitoring standpipe was installed in boreholes GB-BH04 & GB-BH05, records of the post fieldwork monitoring are presented in Appendix VIII.

3.4 Hand Excavated Service Trial Pits

6 No. Hand Excavated Trial Pits were formed using insulated Hand Digging Tools and the assistance of a two tonne excavator to determine the locations of the underground services present together with shallow ground conditions. The positions are shown on the exploratory hole location plan in Appendix I.

This method of investigation allows a safe method of excavation around services together with direct sampling of the near surface deposits for identification purposes, as well as assessment of any salient features and Made Ground or disturbed ground. The trial pits were logged in accordance with BS5930:2015; BS EN ISO 14688-1:2002 and BS EN ISO 14688-2:2004 and supervised at all times by an Engineering Geologist from QGL. All of the trial pits were backfilled with compacted layers of arisings upon completion with suitable surface reinstatement where required.

Details of the Hand Pits including final depths in metres below ground level (mbgl) are provided below in Table 3.

Table 3: Hand Pit details

Exploratory Hole ID	Exploratory Hole Type	Termination Depth (mbgl)	Notes/Reason for Termination
GBHP01	Hand Excavated Trial Pit	1.2	Scheduled Depth
GBHP01A	Hand Excavated Trial Pit	1.2	Scheduled Depth
GBHP02	Hand Excavated Trial Pit	1.2	Scheduled Depth
GBHP03	Hand Excavated Trial Pit	1.2	Scheduled Depth
GBHP04	Hand Excavated Trial Pit	1.2	Scheduled Depth
GBHP05	Hand Excavated Trial Pit	1.2	Scheduled Depth
GBHP05A	Hand Excavated Trial Pit	0.3	Services Located

A complete set of Engineering Geologist Trial Pit logs are presented within Appendix III whilst the results.

Surface reinstatement was undertaken in accordance with NRSWA where required.

3.5 Machine Excavated Trial Pits

8 No. trial pits were excavated using an 8 tonne excavator owned and operated by Spencer ECA as an approved plant supplier to QGL. The exploratory hole positions are shown on the exploratory hole location

plan in Figure 2 in Appendix I.

This method of investigation allows direct sampling of the near surface deposits for identification purposes, locating of buried services, as well as assessment of any salient features and Made Ground or disturbed ground. The trial pits were logged in accordance with BS5930:2015; BS EN ISO 14688-1:2002 and BS EN ISO 14688-2:2004, and supervised at all times by an Engineering Geologist from QGL.

All trial trenches were backfilled with compacted layers of arisings upon completion. Surface reinstatement was undertaken in accordance with NRSWA where required.

Geotechnical and Environmental samples were taken within the superficial deposits for laboratory testing purposes.

Details of the Trial pits including final depths in metres below ground level (mbgl) are provided in Table 4.

Table 4: Trial Pit Detail

Exploratory Hole ID	Exploratory Hole Type	Final Length (mbgl)	Reason for termination
GBTP01	Machine Excavated Trial Pit	2.05	Maximum reach of excavator
GBTP02	Machine Excavated Trial Pit	3.0	Scheduled Depth
GBTP03	Machine Excavated Trial Pit	3.0	Scheduled Depth
GBTP04	Machine Excavated Trial Pit	3.0	Scheduled Depth
GBTP05	Machine Excavated Trial Pit	3.0	Scheduled Depth
GBTP06	Machine Excavated Trial Pit	3.0	Scheduled Depth
GBTP10	Machine Excavated Trial Pit	1.4	Rapid Groundwater Inflow and Significant Instability
GBTP10A	Machine Excavated Trial Pit	2.2	Rapid Groundwater Inflow and Significant Instability

A complete set of Engineering Geologist's Test Hole logs are presented within Appendix III.

3.6 In-Situ Testing

3.6.1 Standard Penetration Testing

Standard penetration tests (SPTs) were undertaken within all boreholes, at intervals specified by Redstart.

This is a dynamic test as described in BS EN ISO 22476-3:2005 + A1:2011. Within fine grained or cohesive soils, the test incorporates a small diameter tube (650mm length, 50mm external diameter and 35mm

internal diameter) with a cutting shoe known as the 'split barrel sampler'. The sampler is forced into the soil dynamically using blows from a 63.5kg hammer dropped through 760mm. The sampler is initially advanced 150mm into the soil with seating blows, then the number of blows required to advance the sampler each 75mm increment up to a depth of 300mm is recorded. This cumulative total number of blows over the 300mm test is referred to as the "N" value. For coarse gravels and bedrock the split barrel is replaced by a 60° cone (SPT(C) - Standard Penetration Test (Cone)). SPT/SPT(C) results are detailed within the relevant borehole Logs. The SPT calibration certificate for the SPT hammer used during this investigation is presented in Appendix II.

3.6.2 Ground Penetrating Radar Survey

A Ground Penetrating Radar (GPR) survey was undertaken by Intersect to identify the underground services in areas as requested by the client.

Figure 1 presented in Appendix V was produced by Intersect showing the services identified during the survey.

3.6.3 Headspace Testing

All environmental soil samples collected were screened using a calibrated Photoionisation Detector onsite to measure isobutylene, prior to being sent to the laboratory.

Soil is placed in a sealed plastic bag, half-filled to allow airspace above the soil and left a period of no less than one hour prior to screening.

Measurements are detailed within the exploratory hole logs included within Appendix II and Appendix III.

3.6.4 Dynamic Probes

A single super heavy dynamic probe holes were undertaken adjacent to Borehole GBBH05 with the results included within Appendix II.

Super Heavy Dynamic Probe testing involves recording the blow counts for every 100mm of driving (N100), using the automated 63.5kg drop hammer and 15cm² cone point with sacrificial cones. Dynamic probing determines the resistance of soils in-situ to the intermittent penetration of a 90° cone when driven dynamically in a standard manner, a continuous record is provided with respect to depth of the resistance of the cone. The information submitted is recorded as the number of blows to drive the cone each 100mm increment. The Dynamic Probe holes were backfilled with Bentonite pellets.

3.7 Soil Sampling

Disturbed samples of soil were taken in clear sealed plastic bags and white plastic tubs. Environmental samples were taken at various depths as noted on the relevant logs.

The environmental samples were dispatched to Chemtest, Coventry using a daily courier service for storage awaiting testing instructions from the Engineer. Environmental soil samples were taken in amber glass jars, vials and plastic tubs provided by the laboratory to suit the anticipated testing.

Geotechnical samples were returned from site to QGL's laboratory for controlled storage to await test scheduling/requirements. For specific details of laboratory testing see Section 4.0.

4.0 LABORATORY TESTING

4.1 General

The laboratory testing was scheduled by Atkins and comprised a number of geotechnical classification and performance tests as well as chemical testing on selected soil samples and ground water samples recovered from the investigation.

4.2 Geotechnical Testing

Geotechnical classification and performance testing was undertaken at QGL's approved UKAS accredited laboratory at GSTL, Llanelli.

Geotechnical tests undertaken on selected soil samples are listed below. All the geotechnical soil testing work was carried out in accordance with the procedures stipulated in the various sections of BS 1377:1990 "Methods of test for soils for civil engineering purposes" and to UKAS accreditation where applicable and chemical testing carried out in accordance with BRE Special Digest 1:2005 "Concrete in aggressive ground".

Geotechnical soil testing undertaken:

- 19 No. Moisture content
- 8 No. Liquid limit, plastic limit and plasticity index
- 7 No. Particle size distribution by wet sieving
- 7 No. PSD – Sedimentation by Pipette
- 6 No. Suite D (Brownfield site pyrite present)
- 7 No. Organic Matter

Geotechnical Laboratory Test results are presented in Appendix VI.

4.3 Geo-Environmental Testing

Geo-Environmental chemical testing was undertaken at Eurofins Chemtest Ltd, Coventry. All testing was scheduled by Atkins. The following suites of testing were scheduled:

- 13 No Suite E (Soil)
- 10 No. Suite F (Leachate)
- 4 No Suite H (Water samples)

Chemical Laboratory Test results are presented in Appendix VII.

5.0 REFERENCES

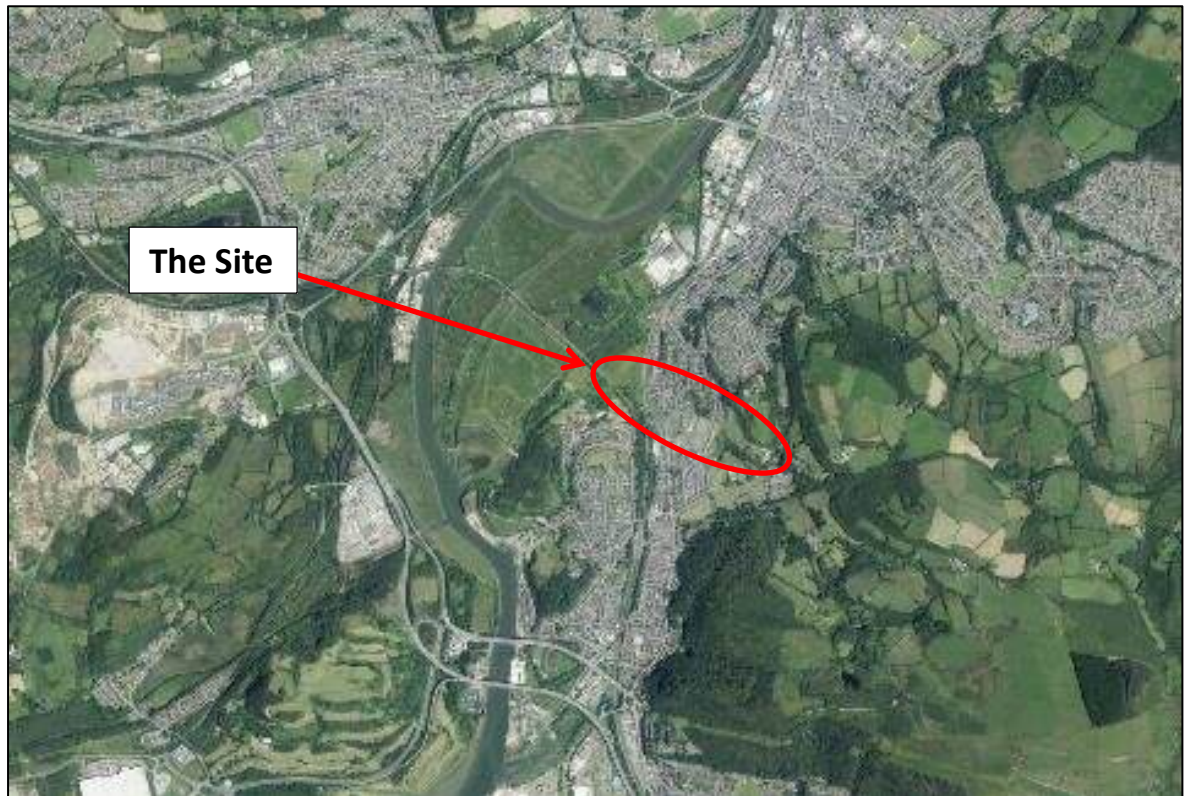
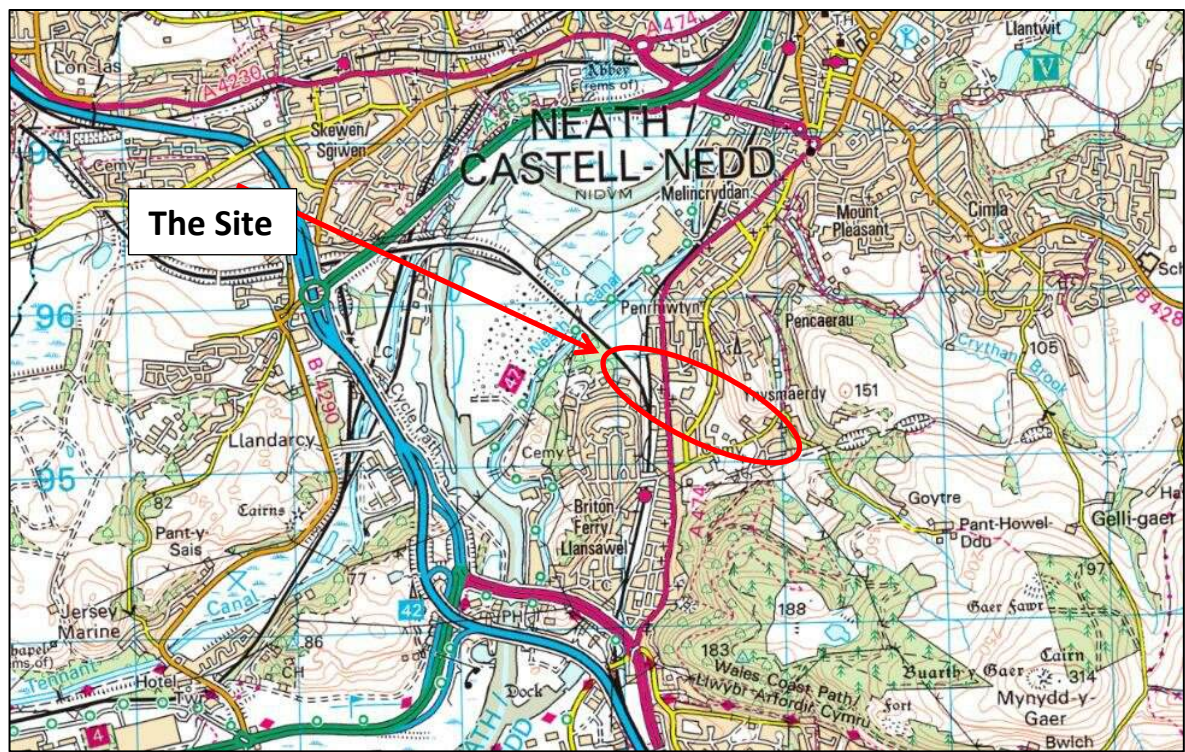
British Geological Survey:

- The British Geological Survey (BGS) sheet 1:50,000 247 (Swansea)
- BGS Geology of Britain Viewer (www.bgs.ac.uk)

Specialist Publications:-

- British Code of Practice BS 5930:2015 '*Code of Practice for Site Investigations*'
- British Code of Practice BS 1377:1990 '*Methods of test for soils for civil engineering purposes*'.
- British Code of Practice BS EN ISO 14688-1:2002+A2:2013 investigation and testing. Identification and classification of soil. Identification and description
- British Code of Practice BS EN ISO 14688-2:2004+A2:2013 Geotechnical investigation and testing. Identification and classification of soil. Principles for a classification.
- British Code of Practice BS EN ISO 14689-1:2003 Ground Investigation and Testing – Identification and classification of rock
- Health and Safety Executive Guidance Note EH40/90
- *CIRIA Report 143* 'The Standard Penetration Test (SPT): Methods and Use', 1995.
- BRE (2005) Special Digest 1:2005, 3rd Edition, Concrete in aggressive ground. BRE, Garston.
- BS 6031: 2009 Code of Practice for Earthworks.
- Workmanship for excavation shall comply with BS 8000: 1989 Part 1, Sections 3.1, 3.2 and 3.3.
- Specification for Highway Works (MCHW 1), Volume 1, Series 600 & Series 800, 2006 with Amendment 2016
- ICE UK Specification for Ground Investigation Second Edition.
- Design Manual for Roads and Bridges: Volume 7 Pavement Design and Maintenance
- Specification for Highways Works Series 600 Earthworks
- Highways Agency Interim Advice Note 73/06, Rev 1 2009, Clause 7.7

APPENDIX I – SITE PLANS AND FIGURES



Mapping sourced from www.bing.com

FIGURE 1

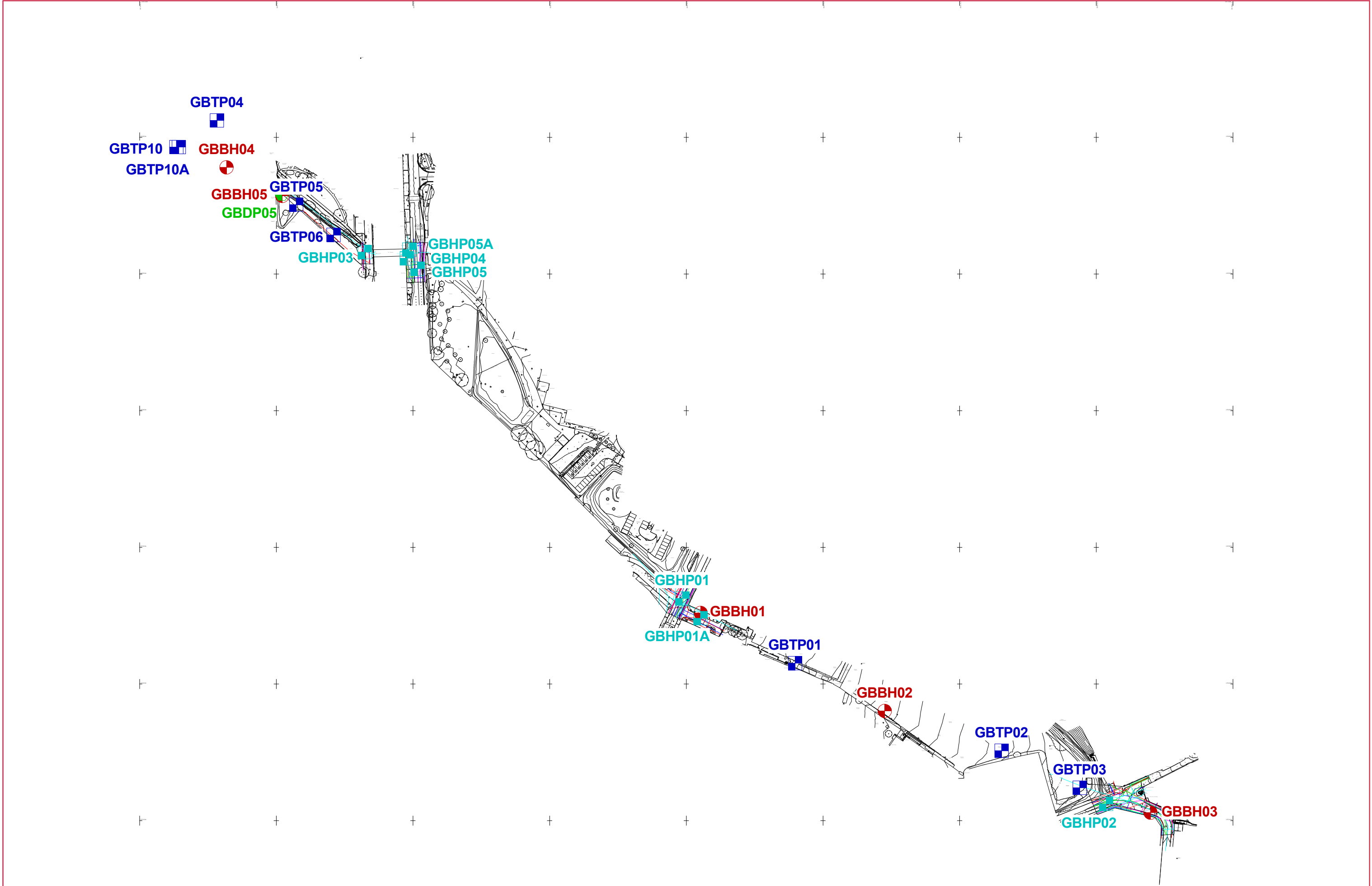
Project: Grandison Brook, Britton Ferry

Job No: Q0560

Drawing Title: Site Location Plan



Plas
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Fax: 01554 776150
Email: enquiries@quantumgeotech.co.uk



APPENDIX II – BOREHOLE LOGS

Contract : Grandison Brook Client : ATKINS											Borehole No. GBBH01	
Dates : 13/7/21 - 13/7/21 Location : Entrance to Llansawel FC				Job Number : Q0560 Engineer : ATKINS				Ground Level : 11.19 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274510.52 E 195251.98 N <i>Co-ordinates to National Grid</i>				

m B.G.L.	Run Details				Fractures		Insitu Tests		Samples		Strata				
	Core Run	TCR %	SCR %	RQD %	Min Avg Max	FI	Depth	Test Results	Depth	Type No. Blows	Depth (Thickness)	Description	Legend	Red. Level A.O.D.	Water
0									0.10 - 0.30	B1	(0.40)	Turf over TOPSOIL: Dark brown sandy slightly gravelly SILT with low cobble content of sandstone and many rootlets.		10.79	
									0.30	ES2	0.40				
									0.50	ES3	(0.30)				
									0.50 - 0.70	B4	0.70	PID @ 0.3mbgl = 2.1ppm		10.49	
									0.80 - 1.20	B5	(0.50)	Soft brown sandy gravelly CLAY. Gravel is angular to sub angular fine to coarse sandstone.			
1	1.20						1.2	SPT (S) 50/110mm (8-13-25-25/35mm--)	1.20	SPTLS ES6	1.20	PID @ 0.5mbgl = 0.6ppm		9.99	
	1.25								1.50 - 2.50	D*	1.60	Very dense orange brown slightly clayey sandy GRAVEL with low cobble content of sandstone. Gravel is angular to sub rounded fine to coarse sandstone.		9.59	
2												PID @ 1.2mbgl = 0.2ppm			
							2.5	SPT (C) 50/15mm (25/10mm-50/15mm--)	2.50 - 3.00	D*		**DRILLERS DESCRIPTION (Sampler refused) - Brown clayey sandy Gravel with cobbles.			
3									3.00 - 4.00	D*		Arisings logged as: Very dense orange brown slightly clayey sandy GRAVEL. Gravel is angular to sub rounded fine to coarse sandstone.			
												**DRILLERS DESCRIPTION (sampler and casing refused) - Gravel, cobbles and boulders.			
4									4.00 - 5.00	D*		Arisings logged as: Very dense grey slightly clayey slightly sandy GRAVEL. Gravel is angular to sub angular fine to coarse sandstone.			
5									5.00 - 6.00	D*	(6.40)				
6									6.00 - 7.00	D*					
7									7.00 - 8.00	D*					
8											8.00	Borehole terminated at 8.0mbgl		3.19	

Hole Progress / Water Obs				Casing		Groundwater				Flush		
Date / Time	H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns
13/07/2021 15:00	8.00	2.50	DRY	2.50	115.00			No groundwater encountered		0.00 - 8.00	Air Mist	

Plant: MC205
Remarks: Hole marked out using co-ordinates supplied by client. Area CAT and Genny scanned, STATS plans checked and permit to excavate issued by QGL. On completion hole backfilled with bentonite pellets with turf at surface. No SPTs beyond 2.5m as unable to case dense material. *Pot sample of arisings **Drillers Description - Sampler refused, borehole continued by open hole hammer, arisings logged.

 Plant: MC205 SA4 OFQ Tel: 01554 744880 email: enquiries@quantumgeotech.co.uk	Operator: GB & GB	Logged By: A Jones	Sheet No. 1 Of 1	m Per Page 8.5	All measurements in metres unless otherwise stated	
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Contract : Grandison Brook Client : ATKINS											Borehole No. GBBH02	
Dates : 5/7/21 - 5/7/21 Location : Briton Ferry RFC					Job Number : Q0560 Engineer : ATKINS			Ground Level : 15.61 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274645.15 E 195180.25 N <i>Co-ordinates to National Grid</i>				

m B.G.L.	Run Details				Fractures		Insitu Tests		Samples		Strata				
	Core Run	TCR %	SCR %	RQD %	Min Avg Max	FI	Depth	Test Results	Depth	Type No. Blows	Depth (Thickness)	Description	Legend	Red. Level A.O.D.	Water
0									0.10 - 0.30	B1	(0.10)	Turf over TOPSOIL: Dark brown slightly gravelly silty Sand.		15.51	
									0.30	ES2	(0.30)	MADE GROUND: Dark brown slightly silty sandy Gravel with low cobble content of sandstone and brick. Gravel is angular to sub angular fine to coarse sandstone and brick with glass. PID @0.3mbgl = 0.1ppm Soft grey slightly gravelly sandy SILT with low cobble content of sandstone. PID @0.5mbgl = 1.2ppm		15.21	
									0.50	ES3	(0.40)				
									0.50 - 0.70	B4	(0.40)				
									0.80 - 1.20	B5	(0.40)				
1	1.20						1.2	SPT (S) 50/190mm (2-2-3-6-41/40mm-)	1.20	SPTLS B7	0.80			14.81	
		70							1.20		(1.40)				
2							2.5	SPT (C) 50/175mm (5-8-5-10-35/25mm-)	2.50 - 4.00	D*	2.20	Dense orange brown slightly silty sandy GRAVEL with low cobble content of sandstone. Gravel is angular to sub angular fine to coarse sandstone. PID @1.0mbgl = 0.0ppm		13.41	
												DRILLERS DESCRIPTION			
3												(Sampler refused) Sandy Gravel with cobbles and boulders.			
4							4	SPT (C) 50/90mm (14-11/5mm-31-19/15mm-)	4.00 - 5.50	D*	(3.30)	Arisings logged as dense grey brown slightly silty sandy GRAVEL. Gravel is angular to sub rounded fine to coarse sandstone.			
5	5.50						5.5	SPT (C) 30 (9-10-7-7-6-10)	5.50 - 6.10	B8	5.50	Dense orange brown slightly silty sandy GRAVEL with low cobble content of sandstone. Gravel is angular to sub angular fine to coarse sandstone.		10.11	
6		83							6.10 - 7.00	D*	(0.60)			9.51	
												DRILLERS DESCRIPTION			
7	7.00						7	SPT (C) 50/4mm (25/2mm-50/4mm-)	7.00 - 8.00	B9	(0.90)	(Sampler refused) Sandy Gravel with cobbles and boulders.			
		60										Arisings logged as Dense grey brown slightly silty sandy GRAVEL. Gravel is angular to sub rounded fine to coarse sandstone.		8.61	
8	8						8	SPT (C) 50/260mm (18-7/20mm-15-12-12-11/35mm-)			(1.00)	Dense orange brown slightly silty sandy GRAVEL with low cobble content of sandstone. Gravel is angular to sub angular fine to coarse sandstone.		7.61	
											8.00	Borehole terminated at 8.0mbgl			

Hole Progress / Water Obs				Casing		Groundwater				Flush		
Date / Time	H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns
05/07/2021 15:30	8.00	8.00	DRY	8.00	115.00			No groundwater encountered		1.20 - 8.00	Air Mist	

Plant: MC205 tracked rig
Remarks: Hole marked out using co-ordinates supplied by client. Area CAT and Genny scanned, STATS plans checked and permit to excavate issued by QGL. On completion hole backfilled with bentonite pellets with turf at surface.
***Pot sample of arisings**
****Drillers Description - Sampler refused, borehole continued by ODEX, arisings logged**

 Quantum Geotech SA4 0FQ Tel: 01554 744880 email: enquiries@quantumgeotech.co.uk	Operator: GB & GB	Logged By: A Jones	Sheet No. 1 Of 1	m Per Page 8.5	All measurements in metres unless otherwise stated	
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Contract : Grandison Brook Client : ATKINS												Borehole No. GBBH03	
Dates : 12/7/21 - 12/7/21 Location : Ynysmaerdy Road / Pant howel Ddu Junction						Job Number : Q0560 Engineer : ATKINS				Ground Level : 22.90 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274839.63 E 195105.88 N <i>Co-ordinates to National Grid</i>			

m B.G.L.	Run Details				Fractures		Insitu Tests		Samples		Strata					Water
	Core Run	TCR %	SCR %	RQD %	Min Avg Max	FI	Depth	Test Results	Depth	Type No. Blows	Depth (Thickness)	Description	Legend	Red. Level A.O.D.		
0									0.10 - 0.20 0.15	B1 ES2	(0.08)	TARMAC		22.82		
											0.08	MADE GROUND: Pale reddish brown slightly silty slightly sandy Gravel. Gravel is angular fine to coarse slag. PID @0.15mbgl = 7.2ppm		22.70		
									0.50 0.50 - 0.70	ES3 B4	(0.12) 0.20					
									0.80 - 1.20	B5	(0.50)	MADE GROUND: Dark grey silty slightly sandy Gravel with low cobble content sandstone. Gravel is angular to sub angular fine to coarse sandstone and siltstone with rare angular fine to medium coal and ash. PID @0.5mbgl = 4.2ppm		22.20		
1	1.20							SPT (S) 21 (4-6-5-4-5-7)	1.10 1.20	ES6 SPTLS	(0.70) (0.55)					
		80							1.50 - 2.20	B7	1.25			21.65		
2									2.20 - 2.50	D*	(0.95)	Brown sandy slightly gravelly SILT. PID @1.1mbgl =0.2ppm		20.70		
	2.50							SPT (S) 46 (5-9-9-15-12-10)	2.50	SPTLS B8	(0.30) 2.50	Medium dense orange brown slightly silty sandy GRAVEL with low cobble content of sandstone. Gravel is angular to sub rounded fine to coarse sandstone and siltstone.		20.40		
3		100							2.50 - 3.40		(0.90)	**DRILLERS DESCRIPTION (Sampler refused): Grey sandy Gravel with cobbles		19.50		
4								SPT (S) 50/190mm (7-11-12-22-16/40mm+)	4.00 4.00 - 5.50	SPTLS D*		Arisings logged as: Medium dense grey slightly silty sandy GRAVEL. Gravel is angular to sub rounded fine to coarse sandstone.				
											(2.10)	Medium dense grey slightly silty sandy GRAVEL with low cobble content of sandstone. Gravel is sub angular to sub rounded fine to coarse sandstone.				
5	5.50							SPT (S) 36 (2-9-11-9-8-8)	5.50 5.50 - 6.40	SPTLS B9	5.50	**DRILLERS DESCRIPTION (Sampler refused): Grey sandy Gravel with cobbles		17.40		
6		56							6.40 - 7.00	D*	(0.90)	Arisings logged as: Dense grey slightly silty sandy GRAVEL. Gravel is angular to sub rounded fine to coarse sandstone.		16.50		
											(0.60)	Medium dense grey slightly silty sandy GRAVEL with low cobble content of sandstone. Gravel is sub angular to sub rounded fine to coarse sandstone.				
7	7.00							SPT (S) 34 (6-4-6-9-9-10)	7.00 7.00 - 7.50	SPTLS B10	7.00	**DRILLERS DESCRIPTION (Sampler refused): Grey sandy Gravel with cobbles		15.90		
		70									(0.60)	Arisings logged as: Medium dense grey slightly silty sandy GRAVEL. Gravel is angular to sub rounded fine to coarse sandstone.		15.30		
8	8							SPT (S) 45 (11-9-12-10-12-11)	7.90 - 8.00 8.00	D11 SPTLS	(0.40) 8.00	Medium dense grey slightly silty sandy GRAVEL with low cobble content of sandstone. Gravel is sub angular to sub rounded fine to coarse sandstone.		14.90		

Hole Progress / Water Obs				Casing		Groundwater				Flush		
Date / Time	H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns
12/07/2021 15:00	8.00	7.00		7.00	115.00	2.50	2.30	Medium groundwater ingress at 2.5mbgl		0.00 - 7.50	Air	

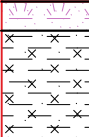
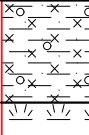
Plant: MC205
Remarks: Hole marked out using co-ordinates supplied by client. Area CAT and Genny scanned, STATS plans checked and permit to excavate issued by QGL. On completion hole backfilled with bentonite pellets with concrete to 0.1mbgl and Tarmac to surface.
****Drillers Description - Sampler refused, borehole continued by ODEX, arisings logged.**

 Plant: Navydd, Llanedi, Pontarddulais, Swansea SA4 0FQ Tel: 01554 744880 email: enquiries@quantumgeotech.co.uk	Operator: GB & AJ	Logged By: A Jones	Sheet No. 1 Of 2	m Per Page 8.5	All measurements in metres unless otherwise stated	
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Form Name: ROTARY. Version 2.11.000, 22/05/15 Output By: Arwel Jones. Library File: C:\USERS\ARWEL JONES\QUANTUM GEOTECHNIC LTD\QUANTUM GEOTECHNICAL - COMPANY\GINT\QUANTUM\LIBRA

Contract : Grandison Brook Client : ATKINS												Borehole No. GBBH03						
Dates : 12/7/21 - 12/7/21 Location : Ynysmaerdy Road / Pant howel Ddu Junction						Job Number : Q0560 Engineer : ATKINS				Ground Level : 22.90 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274839.63 E 195105.88 N <i>Co-ordinates to National Grid</i>								
m B.G.L.	Run Details				Fractures		Insitu Tests		Samples		Strata							
	Core Run	TCR %	SCR %	RQD %	Min Avg Max	FI	Depth	Test Results	Depth	Type No. Blows	Depth (Thickness)	Description	Legend	Red. Level A.O.D.	Water			
9												Medium Dense dark grey slightly silty slightly gravelly SAND. Sand is fine to coarse. Borehole terminated at 8.0mbgl						
10																		
11																		
12																		
13																		
14																		
15																		
16																		
Hole Progress / Water Obs				Casing				Groundwater				Flush						
Date / Time		H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour		Sealed	Depth	Type	Returns				
Plant: MC205 Remarks: Hole marked out using co-ordinates supplied by client. Area CAT and Genny scanned, STATS plans checked and permit to excavate issued by QGL. On completion hole backfilled with bentonite pellets with concrete to 0.1mbgl and Tarmac to surface. **Drillers Description - Sampler refused, borehole continued by ODEX, arisings logged.																		
 Plas Newydd, Llanedi, Pontarddulais, Swansea SA4 0FQ Tel: 01554 744880 email: enquiries@quantumgeotech.co.uk							Operator: GB & AJ		Logged By: A Jones		Sheet No. 2 Of 2		m Per Page 8.5		All measurements in metres unless otherwise stated			

Contract : Grandison Brook Client : ATKINS												Borehole No. GBBH04	
Dates : 15/11/21 - 15/11/21 Location : Land west of railway line				Job Number : Q0560 Engineer : ATKINS				Ground Level : 4.99 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274163.57 E 195578.11 N <i>Co-ordinates to National Grid</i>					

m B.G.L.	Run Details				Fractures		Insitu Tests		Samples		Strata				Water	Install/ Backfill
	Core Run	TCR %	SCR %	RQD %	Min Avg Max	FI	Depth	Test Results	Depth	Type No. Blows	Depth (Thickness)	Description	Legend	Red. Level A.O.D.		
0									0.50 0.50 - 1.00	ES1 B2	(0.20) 0.20 (0.80)	TOPSOIL: Black sandy clayey SILT with rootlets. Soft grey slightly silty slightly sandy CLAY. PID @ 0.5mbgl = 0.0ppm		4.79		
1	1.20							SPT (S) 8 (2-1-2-2-2-2)	1.20 1.20 - 1.70	ES3 B5	(0.70)	Soft grey slightly silty slightly sandy slightly gravelly CLAY. PID @ 0.5mbgl = 0.0ppm		3.99		
2	73								1.80 - 2.00	B6	(0.40)	Brown PEAT		3.29		
									2.10 - 2.30	D7	(0.20)	Soft grey slightly sandy slightly gravelly organic CLAY		2.89		
3	2.70	0						SPT (S) 33 (7-3-3-4-9-17)			2.30	** DRILLERS DESCRIPTION: Sandy GRAVEL with cobbles Arrisings logged as: Medium dense brownish grey slightly silty sandy GRAVEL. Gravel is angular to sub rounded fine to coarse sandstone.		2.69		
4	4.20							SPT (S) 50/23mm (25-50/23mm--)	4.20 - 5.00	B8	4.20	Dense brownish grey slightly silty sandy GRAVEL. Gravel is sub angular to sub rounded fine to coarse sandstone.		0.79		
5											(0.80)					
6	5.70	0						SPT (S) 50/10mm (4-20-38/10mm-12mm--)			5.00	** DRILLERS DESCRIPTION: Sandy GRAVEL with cobbles Arrisings logged as: Dense brownish grey slightly silty sandy GRAVEL. Gravel is angular to sub rounded fine to coarse sandstone.		-0.01		
7	7.20 7.25	0						SPT (S) 50/10mm (9-16-45/10mm-5mm--)			(3.00)					
8								SPT (S) 50/5mm (11-14-26/5mm-20mm-4mm--)			8.00	Borehole terminated at scheduled depth, 8.0mbgl		-3.01		

Hole Progress / Water Obs				Casing		Groundwater				Flush		
Date / Time	H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns
15/11/2021 14:00	8.00	8.00		8.00	115.00	1.20 5.70		Slow groundwater ingress at base of pit, 1.2mbgl; Fast ground water ingress at 5.7mbgl				

Plant: Commachio 205
Remarks: Hole marked out with client. Area CAT and Genny scanned, STATS plans checked and permit to excavate issued by QGL. On completion hole backfilled with bentonite pellets with turf at surface.
 *Pot sample of arrisings

****Drillers Description - Sampler refused, borehole continued by open hole hammer, arisings logged.**

 Quantum Geotech SA4 0FQ Tel: 01554 744880 email: enquiries@quantumgeotech.co.uk	Operator: M OB & DJ Logged By: A Jones Sheet No. 1 Of 1 m Per Page 8.5 All measurements in metres unless otherwise stated	
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Contract : Grandison Brook Client : ATKINS												Borehole No. GBBH05	
Dates : 6/7/21 - 7/7/21 Location : Land to rear of Farm Rd.						Job Number : Q0560 Engineer : ATKINS				Ground Level : 5.79 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274204.33 E 195557.24 N <i>Co-ordinates to National Grid</i>			

m B.G.L.	Run Details				Fractures		Insitu Tests		Samples		Strata				Water	Install/ Backfill
	Core Run	TCR %	SCR %	RQD %	Min Avg Max	FI	Depth	Test Results	Depth	Type No. Blows	Depth (Thickness)	Description	Legend	Red. Level A.O.D.		
0									0.10	D1	(0.35)	Turf over TOPSOIL: Brown slightly gravelly clayey Sand with many rootlets.				
									0.30	ES2	0.35	PID @0.3mbgl = 0.0ppm		5.44		
									0.50	ES3	(0.35)					
									0.50 - 0.60	B4						
									0.80 - 1.20	B5	0.70	MADE GROUND: Dark brown sandy slightly gravelly Clay with low cobble content of brick and plastic.		5.09		
1	1.20								1.00	ES6		PID @0.5mbgl = 2.7ppm				
									1.20	SPTLS	(1.30)	MADE GROUND: Black silty slightly sandy Gravel with low cobble content of siltstone, brick and slag. Gravel is angular to sub angular fine to coarse siltstone, sandstone, ash, slag, brick and concrete, angular fine to medium coal with glass bottles and plastic				
									1.20 - 1.80	B7		PID @1.0mbgl = 5.6ppm				
2		77							2.00 - 2.50	B8	2.00	Very soft dark brown slightly sandy slightly gravelly organic CLAY.		3.79		
									2.30	ES9	(0.50)	PID @2.3mbgl = 1.8ppm				
	2.50								2.50	SPTLS	2.50	Very soft brown very fibrous PEAT.		3.29		
									2.80	10						
3		67							3.00 - 4.00	B11	(2.70)					
									4.00	SPTLS						
	4.00								4.20	D12						
									4.50 - 5.00	B13						
4		73							5.20 - 5.50	B12	5.20	Soft brown slightly clayey sandy SILT.		0.59		
									5.50 - 6.00	D*	5.50	**DRILLERS DESCRIPTION** SAND and Gravel with cobbles.		0.29		
									6.00 - 7.00	D*	(1.50)	Arising logged as Brown grey SAND and GRAVEL. Sand is fine to coarse. Gravel is angular to sub rounded fine to coarse sandstone.				
5											7.00	Borehole terminated at 7.0mbgl due to sand rising up casing blocking equipment. GBDP05 carried out adjacent to borehole as instructed by engineer.		-1.21		
6																
7																
8																

Hole Progress / Water Obs				Casing		Groundwater				Flush		
Date / Time	H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns
06/07/2021 16:00	5.00	7.00	3.60	7.00	115.00	4.00	3.60	Medium groundwater ingress at 4.0mbgl	4.00	0.00 - 7.00	Air Mist	

Plant: MC205 tracked rig
Remarks: Hole marked out using co-ordinates supplied by client. Area CAT and Genny scanned, STATS plans checked and permit to excavate issued by QGL. Hole terminated due to sand blowing back inside casing. On completion hole installed as required by engineer.
***Pot sample of arisings**
****Drillers Description - Sampler refused, borehole continued by ODEX, arisings logged**

 Quantum Geotech SA4 0FQ Tel: 01554 744880 email: enquiries@quantumgeotech.co.uk	Operator: GB & GB	Logged By: A Jones	Sheet No. 1 Of 1	m Per Page 8.5	All measurements in metres unless otherwise stated	
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Contract : Grandison Brook Client : ATKINS										Dynamic Probe GBDP05	
Dates : 7/7/21 - 7/7/21 Location : Land to rear of Farm Rd.					Job Number : Q0560 Engineer : ATKINS					Ground Level : 5.67 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274203.96 E 195558.19 N <i>Co-ordinates to National Grid</i>	

Depth (m)	Reading (Blows / 100mm)					BLOW COUNT (N100 VALUES)										Torque (Nm)	Remarks
	1	2	3	4	5	5	10	15	20	25	30	35	40	45			
0.0	0																
0.1	1																
0.2		0															
0.3			0														
0.4	0			0													
0.5		1															
0.6			0														
0.7				1													
0.8	0				0												
0.9		1															
1.0			0														
1.1				0													
1.2					0												
1.3	0																
1.4		0															
1.5			0														
1.6	0			0													
1.7		0															
1.8			0														
1.9				0													
2.0	0				0												
2.1		0															
2.2			0														
2.3				0													
2.4	0				0												
2.5		0															
2.6			0														
2.7				0													
2.8	0				0												
2.9		0															
3.0			0														
3.1	0																
3.2		0															
3.3			0														
3.4				0													
3.5	0				0												
3.6		0															
3.7			0														
3.8				0													
3.9	0				0												
4.0		1															
4.1			1														
4.2				2													
4.3					1												
4.4	1																
4.5		1															
4.6			1														
4.7				2													
4.8					2												
4.9	2																
5.0		2															
5.1			2														
5.2				1													
5.3					1												
5.4	6																
5.5		9															
5.6			8														
5.7				9													
5.8	8				10												
5.9		6															
6.0			10														
6.1				11													
6.2					9												
6.3	7																
6.4		7															
6.5			7														
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6.7	7				6												
6.8		6															
6.9			6														
7.0				6													
7.1	7				6												
7.2		6															
7.3			6														
7.4				6													
7.5	7				6												
7.6		7															
7.7			6														
7.8				4													
7.9					4												
8.0	4																
8.1		4															
8.2			4														
8.3				4													
8.4					5												
8.5	5																
8.6		7															
8.7			6														
8.8				9													
8.9					9												
9.0	8																
9.1		7															
9.2			10														
9.3				14													
9.4					14												
9.5	9																
9.6		8															
9.7			8														
9.8				12													
9.9					14												

Equipment: Dando Terrier Test carried out in accordance with BS 1377 (1990):Part 9, Sect.3.2					Comments: Hole positioned adjacent to GBBH05. Area CAT and Genny scanned, STATS plans checked and permit to excavate issued by QGL. Test carried out to provide test data to area rotary drilling failed.				
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 Plas Newydd, Llanedi, Pontarddulais, Swansea SA4 0FQ Tel: 01554 744880 email: enquiries@quantumgeotech.co.uk	Operator: GB Logged By: A Jones	Sheet No. 1 Of 2	m Per Page 10	All measurements in metres unless otherwise stated	
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Form Name: DYNAMIC PROBE. Version 2.10.000, 29/04/13 Output By: Arwel Jones. Library File: C:\USERS\ARWEL JONES\QUANTUM GEOTECHNIC LTD\QUANTUM GEOTECHNICAL - COMPANY\GINT\QUANTUM.L

Contract : Grandison Brook										Dynamic Probe							
Client : ATKINS										GBDP05							
Dates : 7/7/21 - 7/7/21					Job Number : Q0560					Ground Level : 5.67 m A.O.D. <i>Level to Ordnance Datum</i>							
Location : Land to rear of Farm Rd.					Engineer : ATKINS					Coordinates: 274203.96 E 195558.19 N <i>Co-ordinates to National Grid</i>							
Depth (m)	Reading (Blows / 100mm)					BLOW COUNT (N100 VALUES)										Torque (Nm)	Remarks
	1	2	3	4	5	5	10	15	20	25	30	35	40	45			
15																	
10.5																	
11.0																	
11.5																	
12.0																	
12.5																	
13.0																	
13.5																	
14.0																	
14.5																	
15.0																	
15.5																	
16.0																	
16.5																	
17.0																	
17.5																	
18.0																	
18.5																	
19.0																	
19.5																	
Equipment: Dando Terrier										Comments: Hole positioned adjacent to GBBH05. Area CAT and Genny scanned, STATS plans checked and permit to excavate issued by QGL. Test carried out to provide test data to area rotary drilling failed							
Test carried out in accordance with BS 1377 (1990):Part 9, Sect.3.2																	
 Plas Newydd, Llanedi, Pontarddulais, Swansea SA4 0FQ Tel: 01554 744880 email: enquiries@quantumgeotech.co.uk					Operator: GB		Logged By: A Jones		Sheet No. 2 Of 2		m Per Page 10		All measurements in metres unless otherwise stated				



SPT Calibration Report

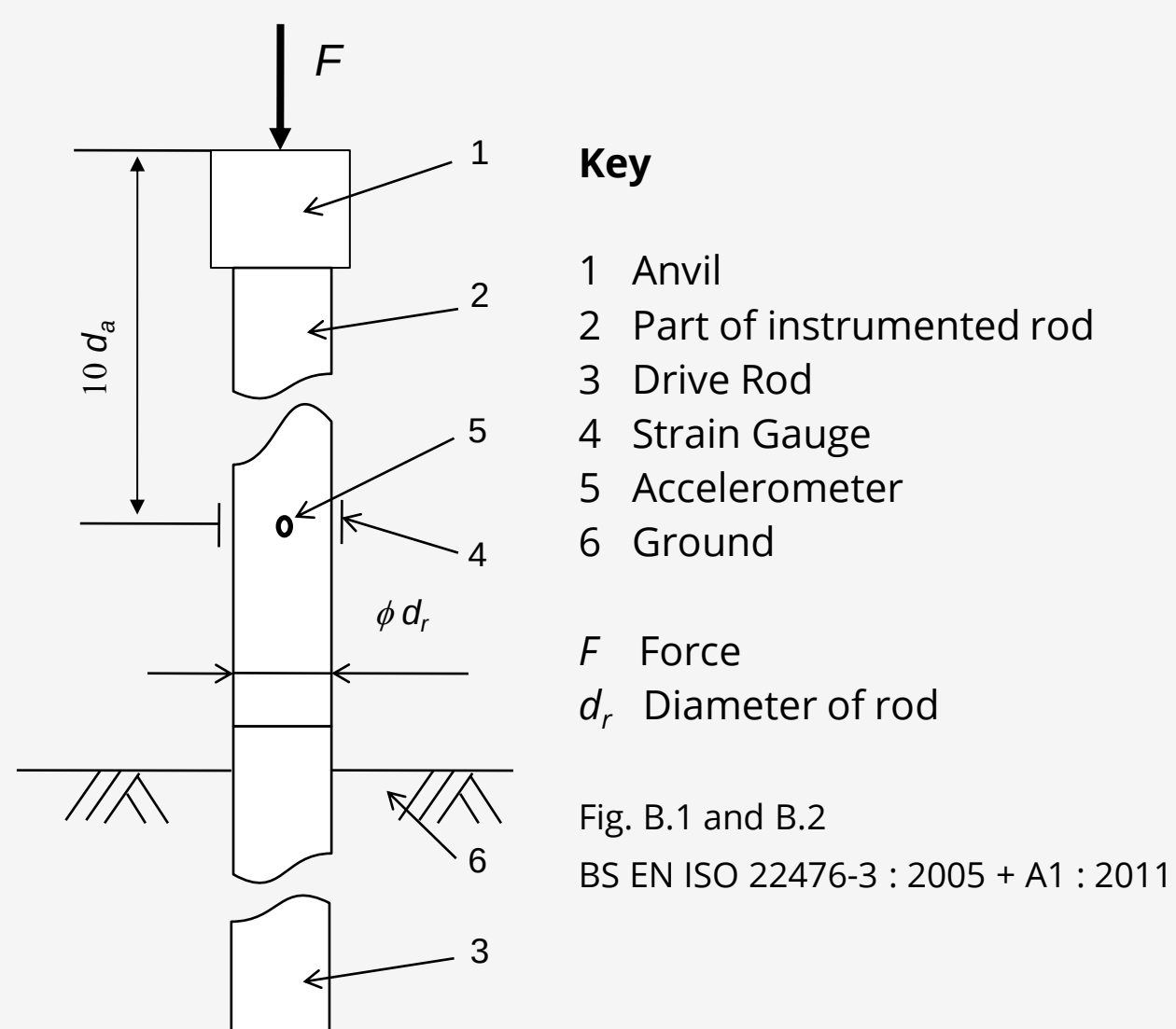
Hammer Energy Measurement Report

Type of Hammer SPT HAMMER
Test No EQU2808
Client QUANTUM GEOTECHNIC

Test Depth (m) 9.80
Mass of hammer $m = 63.5\text{kg}$
Falling height $h = 0.76\text{m}$
 $E_{\text{theor}} = m \times g \times h = 473\text{J}$

Characteristics of the instrumented rod

Diameter $d_r = 0.052\text{ m}$
Length of instrumented rod 0.558 m
Area $A = 11.61\text{ cm}^2$
Modulus $E_a = 206843\text{ MPa}$



DATE OF TEST VALID UNTIL HAMMER ID

21/04/2021 21/04/2022 Q2 AR830

$E_{\text{meas}} = 0.320\text{ kN-m}$

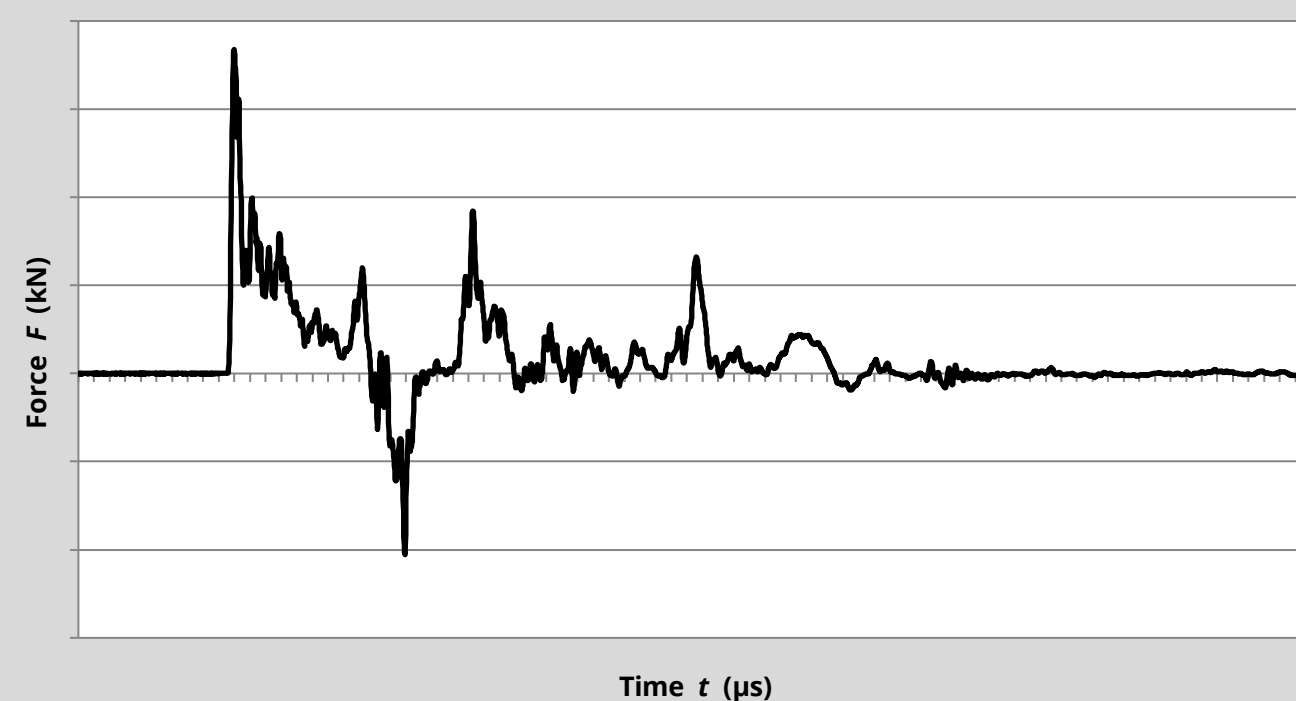
$E_{\text{theor}} = 0.473\text{ kN-m}$

Comments

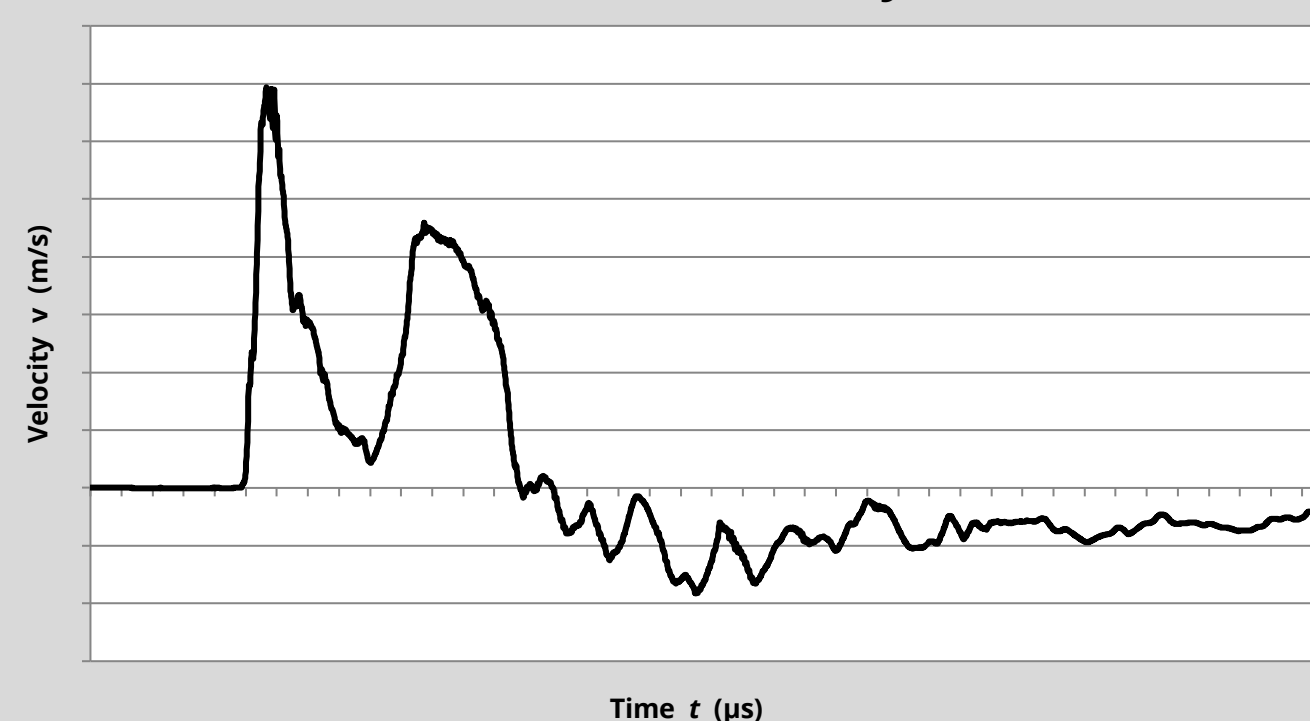
$$\text{Energy Ratio (Er)} = \frac{E_{\text{meas}}}{E_{\text{theor}}}$$

67.69%
© COPYRIGHT 2021

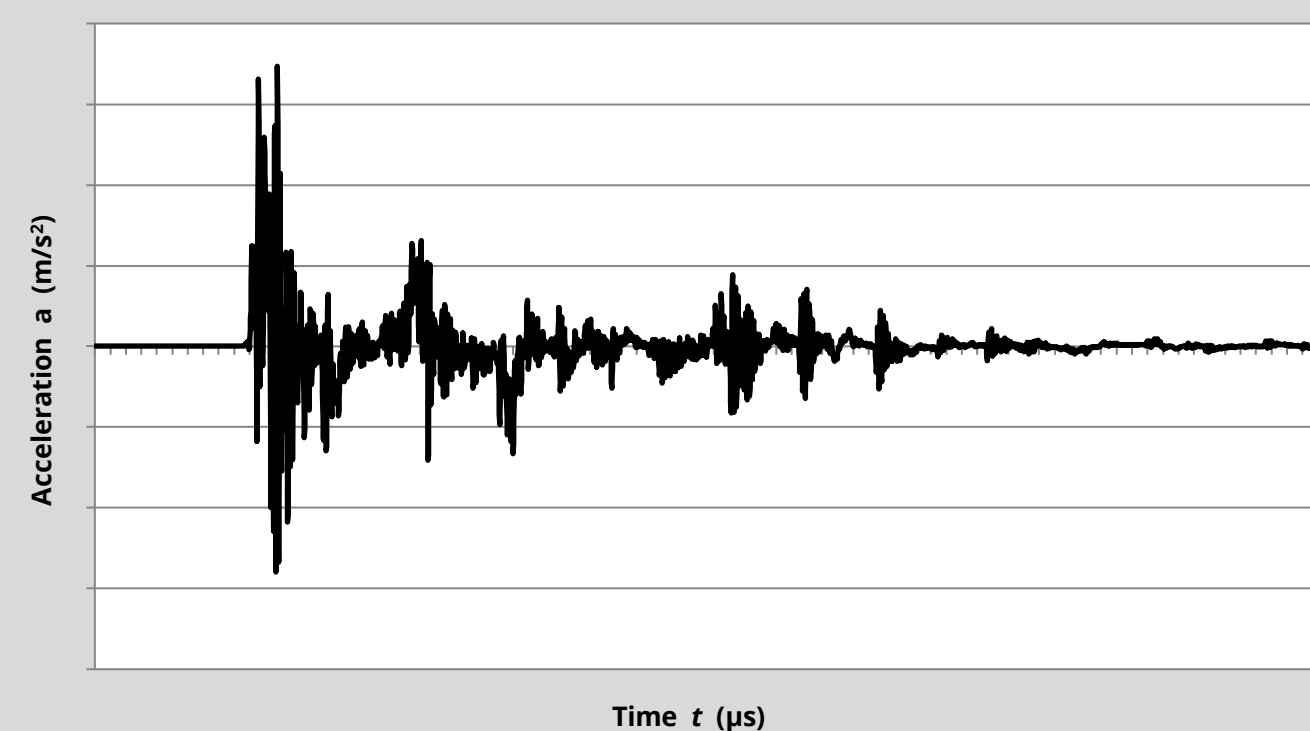
Force



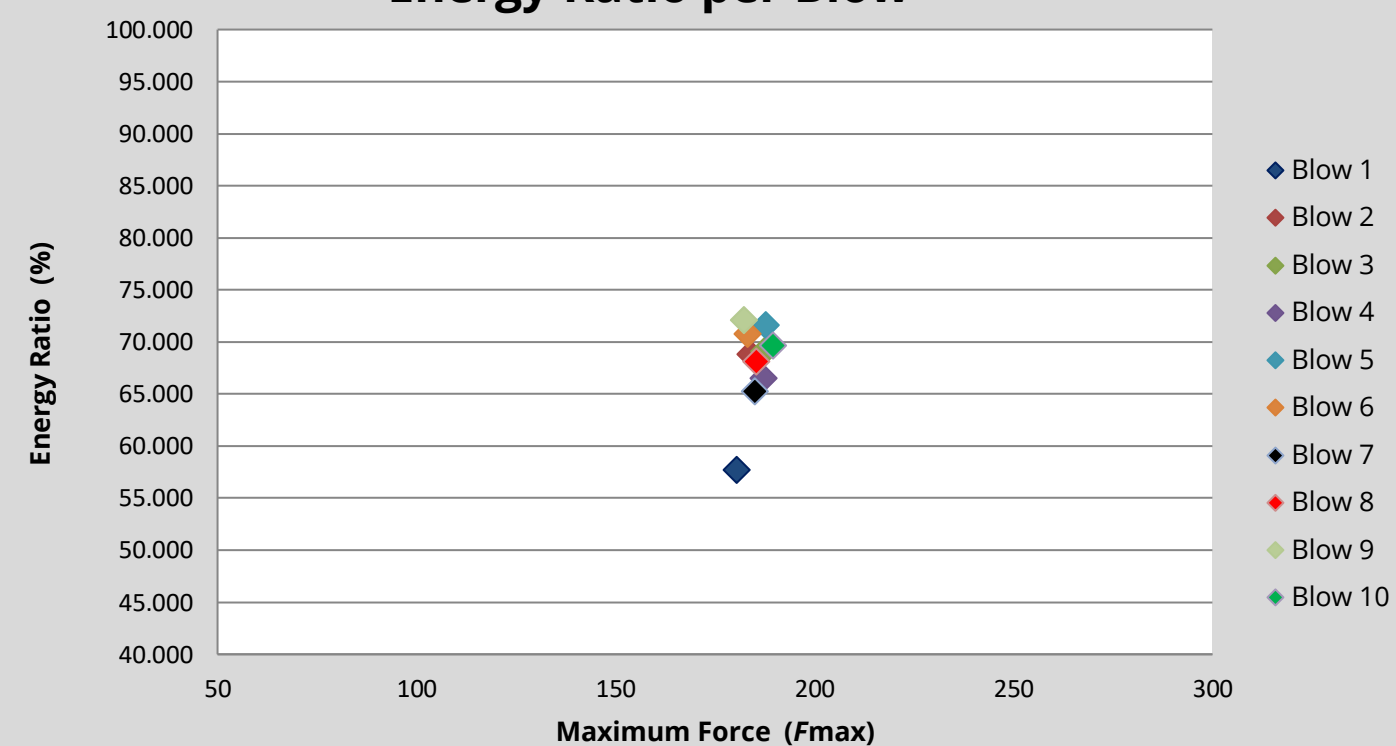
Particle Velocity



Acceleration



Energy Ratio per Blow



Equipe SPT Analyzer Operator

JL

Certificate prepared by

27/04/2021

Certificate checked by

27/04/2021

Certificate date

27/04/2021



SPT Calibration Report

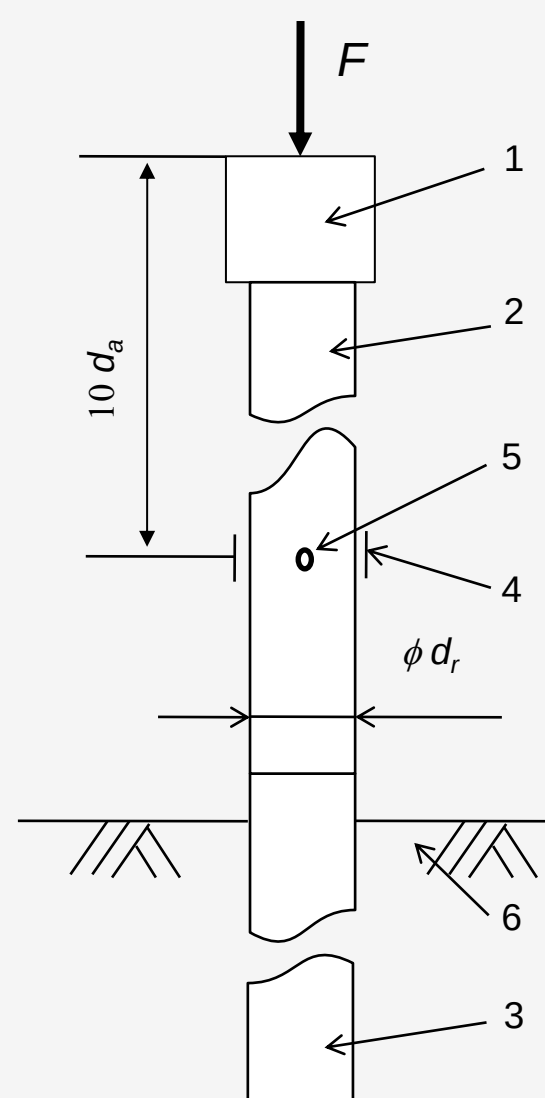
Hammer Energy Measurement Report

Type of Hammer TERRIER
Test No EQU2635
Client QUANTUM GEOTECH

Test Depth (m) 9.60
Mass of hammer $m = 63.5\text{kg}$
Falling height $h = 0.76\text{m}$
 $E_{\text{theor}} = m \times g \times h = 473\text{J}$

Characteristics of the instrumented rod

Diameter $d_r = 0.052\text{ m}$
Length of instrumented rod 0.558 m
Area $A = 11.61\text{ cm}^2$
Modulus $E_a = 206843\text{ MPa}$



Key

- 1 Anvil
- 2 Part of instrumented rod
- 3 Drive Rod
- 4 Strain Gauge
- 5 Accelerometer
- 6 Ground

F Force
 d_r Diameter of rod

Fig. B.1 and B.2
BS EN ISO 22476-3 : 2005 + A1 : 2011

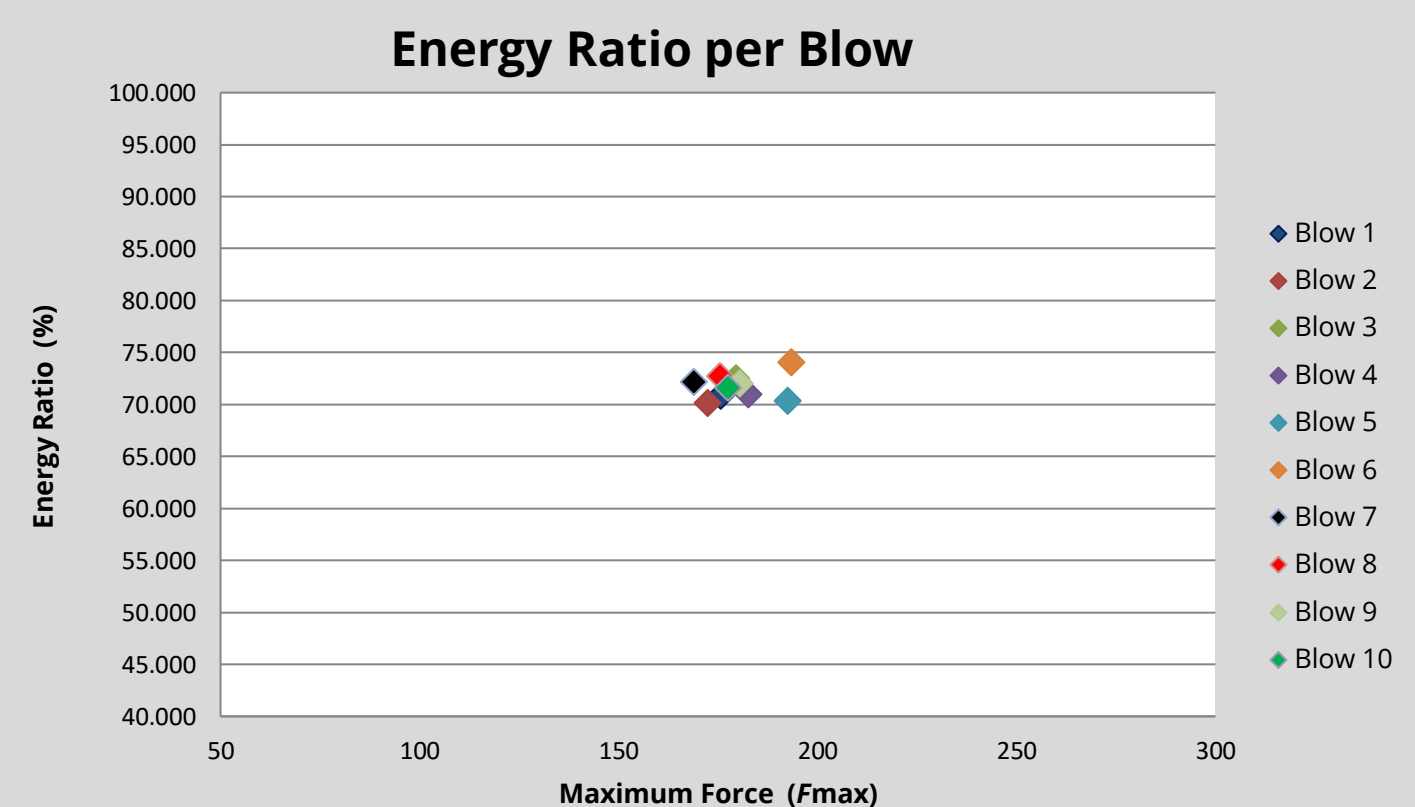
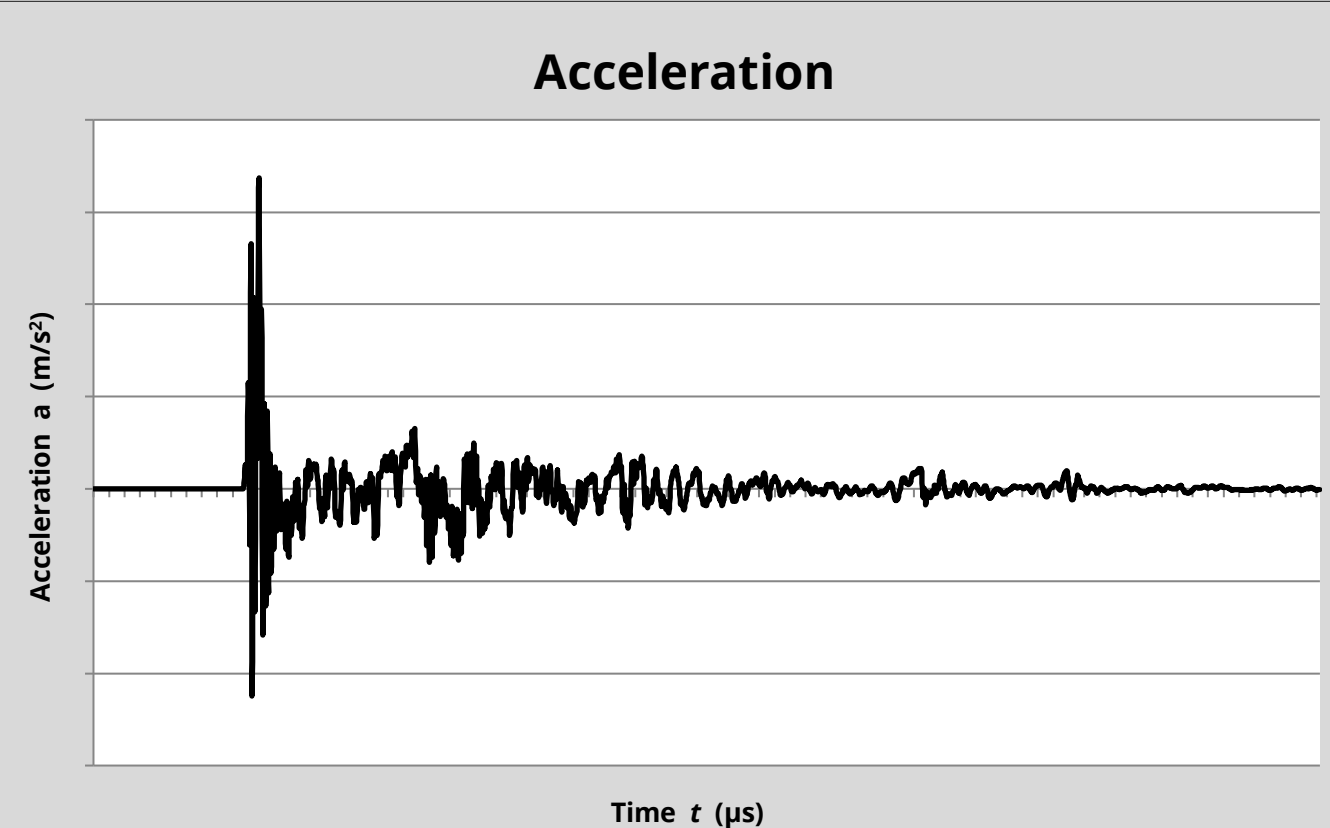
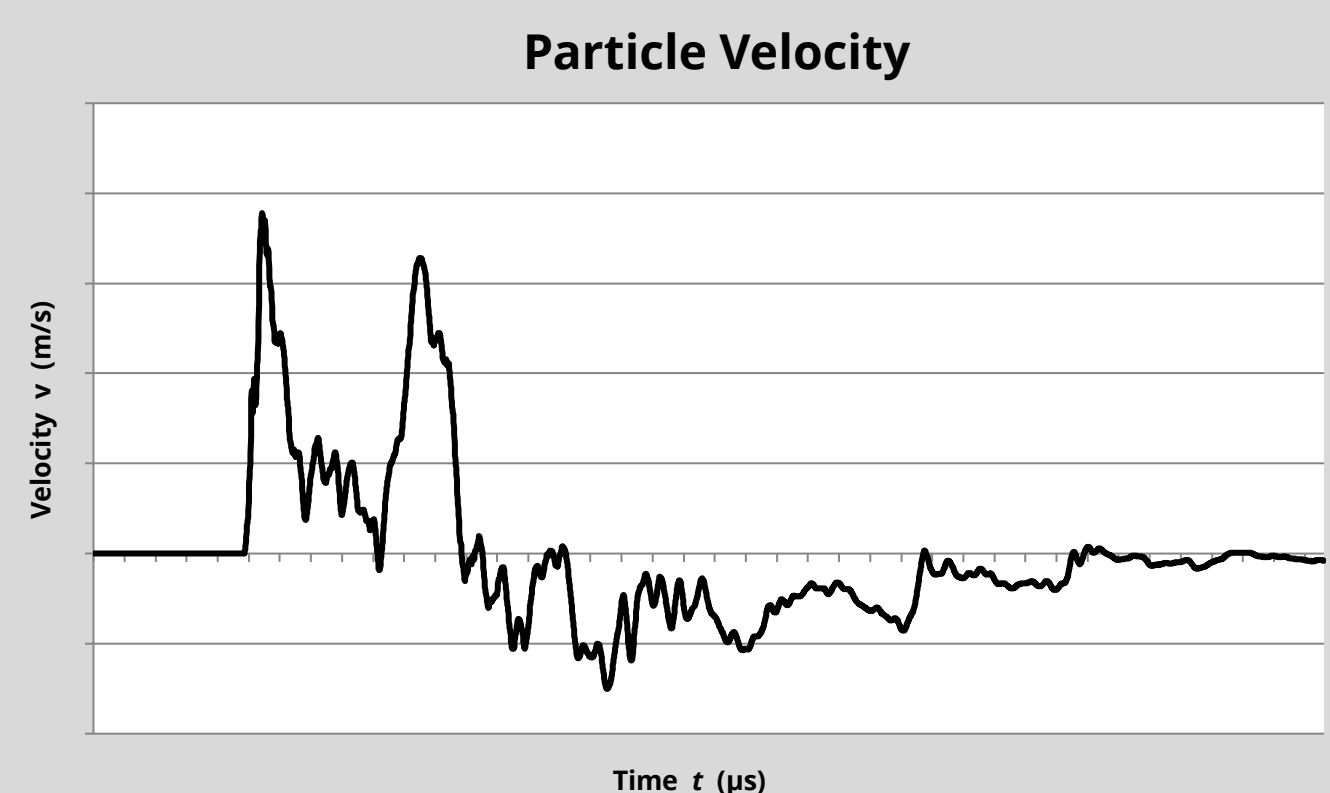
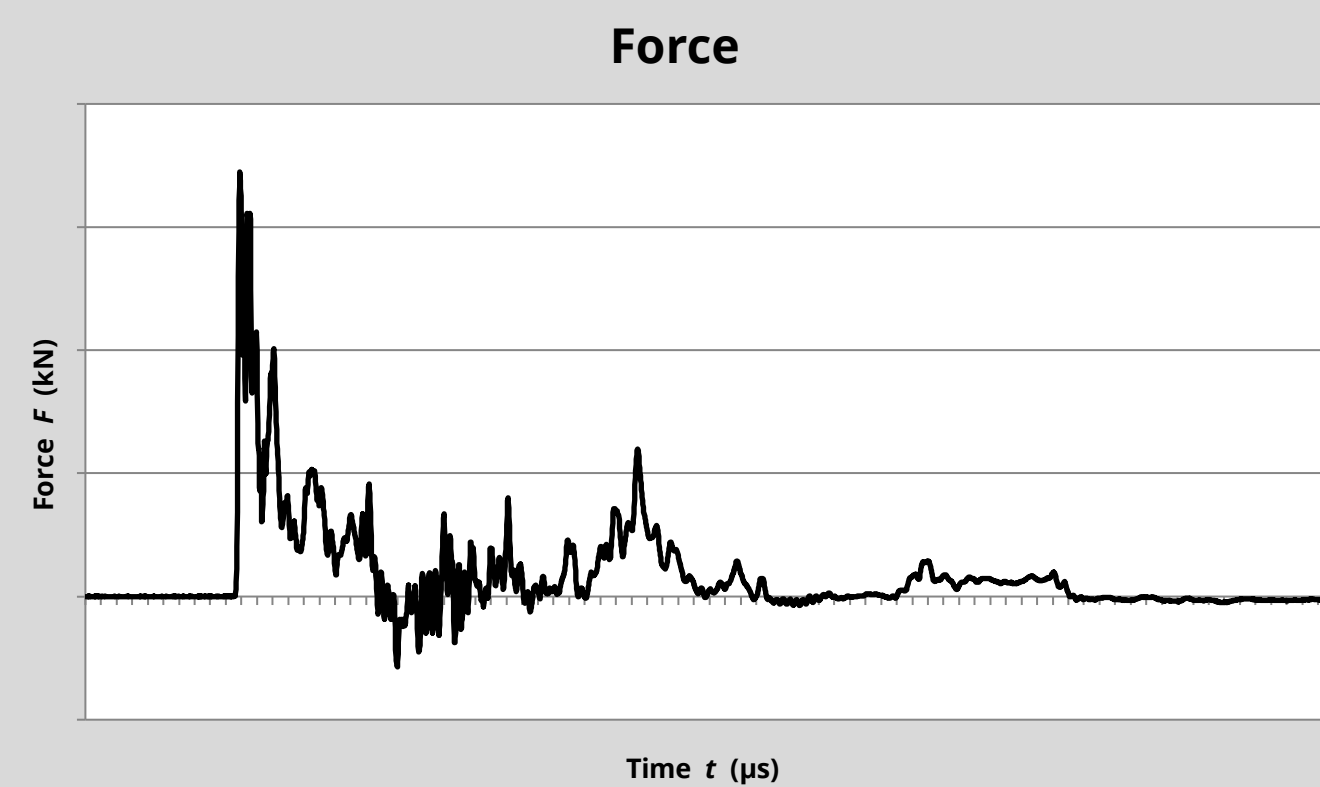
DATE OF TEST VALID UNTIL HAMMER ID

23/10/2020 23/10/2021 DT/13137

$E_{\text{meas}} = 0.338\text{ kN-m}$

$E_{\text{theor}} = 0.473\text{ kN-m}$

Comments



Energy Ratio (Er) = $\frac{E_{\text{meas}}}{E_{\text{theor}}}$

71.45%
© COPYRIGHT 2020

Equipe SPT Analyzer Operator

AF

Certificate prepared by

[Signature]
23/10/2020

Certificate checked by

[Signature]
23/10/2020

Certificate date

23/10/2020



SPT Calibration Report

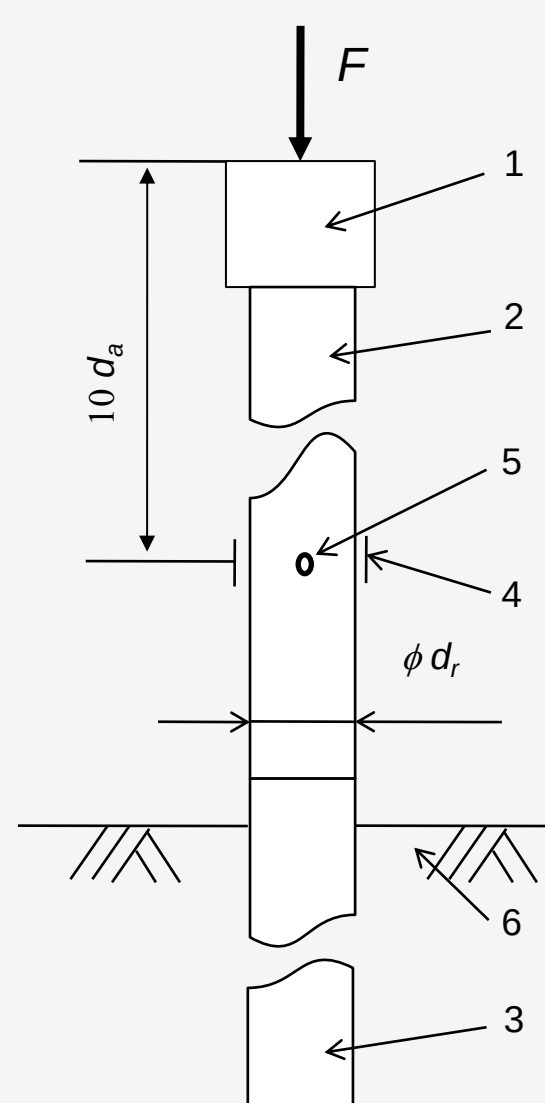
Hammer Energy Measurement Report

Type of Hammer SPT HAMMER
Test No EQU2811
Client QUANTUM GEOTECHNIC

Test Depth (m) 9.80
Mass of hammer $m = 63.5\text{kg}$
Falling height $h = 0.76\text{m}$
 $E_{\text{theor}} = m \times g \times h = 473\text{J}$

Characteristics of the instrumented rod

Diameter $d_r = 0.052\text{ m}$
Length of instrumented rod 0.558 m
Area $A = 11.61\text{ cm}^2$
Modulus $E_a = 206843\text{ MPa}$



Key

- 1 Anvil
- 2 Part of instrumented rod
- 3 Drive Rod
- 4 Strain Gauge
- 5 Accelerometer
- 6 Ground

F Force
 d_r Diameter of rod

Fig. B.1 and B.2
BS EN ISO 22476-3 : 2005 + A1 : 2011

DATE OF TEST VALID UNTIL HAMMER ID

21/04/2021

21/04/2022

Q3

$E_{\text{meas}} = 0.315\text{ kN-m}$

$E_{\text{theor}} = 0.473\text{ kN-m}$

Comments

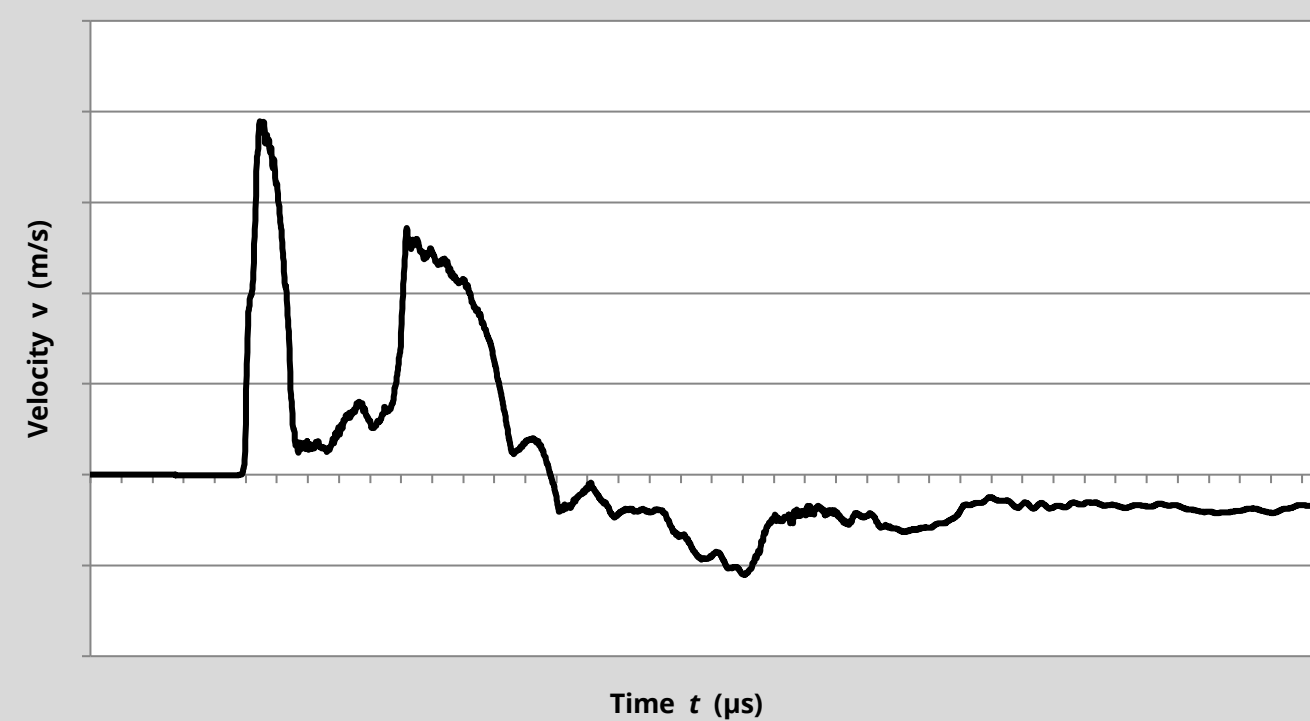
$$\text{Energy Ratio (Er)} = \frac{E_{\text{meas}}}{E_{\text{theor}}}$$

66.51%
© COPYRIGHT 2021

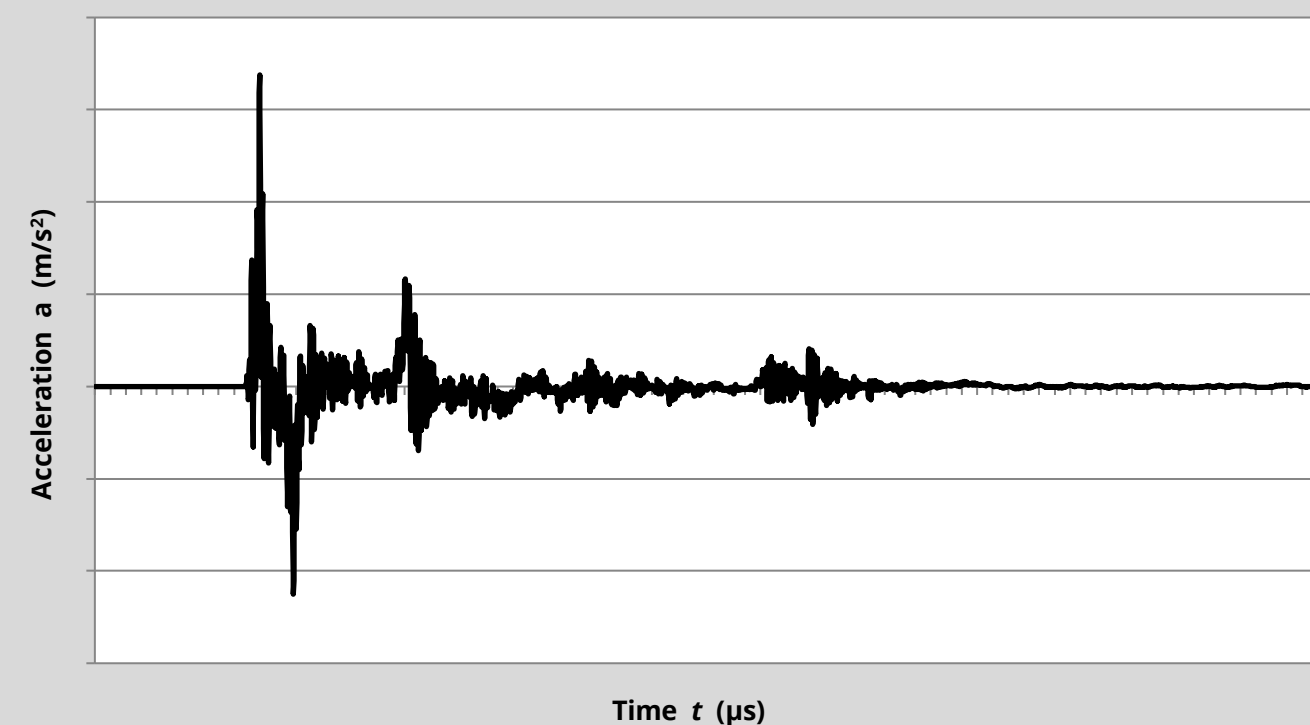
Force



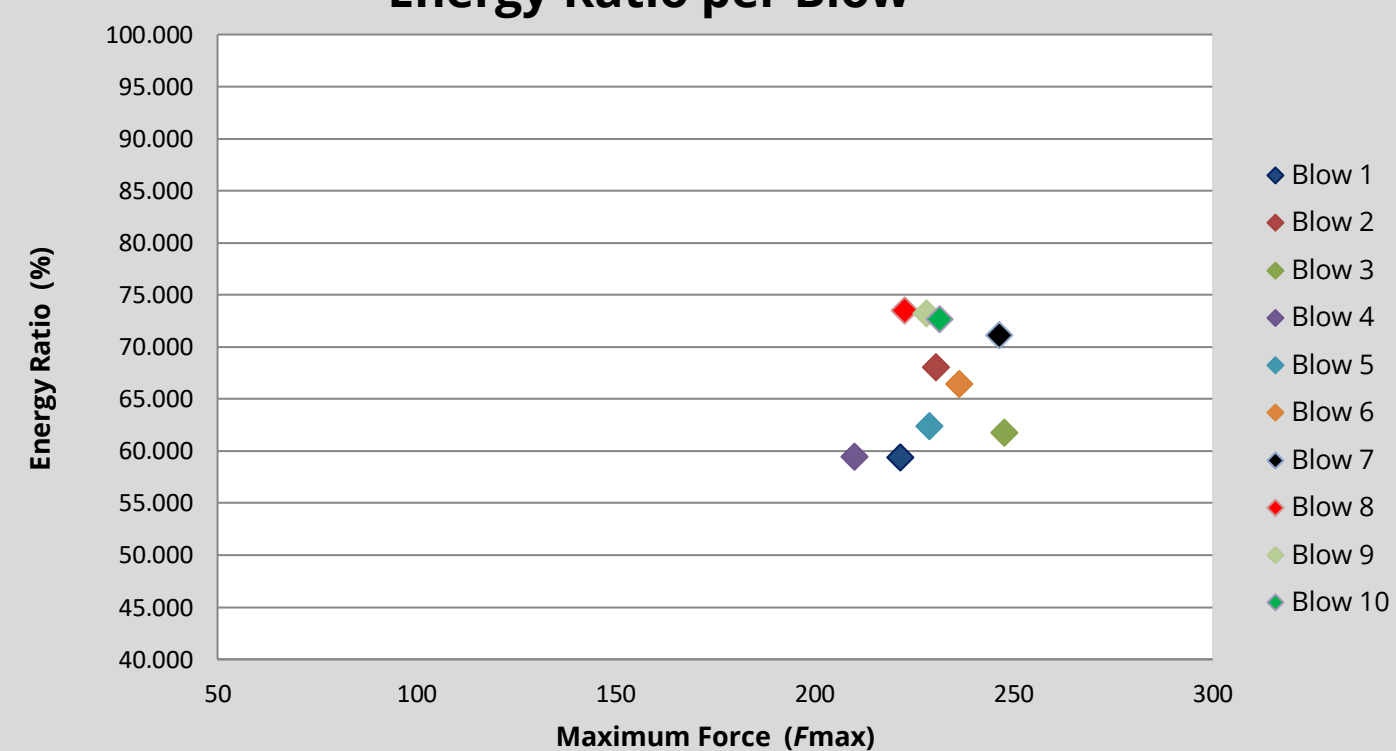
Particle Velocity



Acceleration



Energy Ratio per Blow



Equipe SPT Analyzer Operator

JL

Certificate prepared by

27/04/2021

Certificate checked by

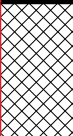
27/04/2021

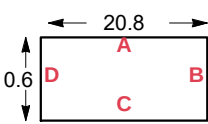
Certificate date

27/04/2021

APPENDIX III – HAND EXCAVATED SERVICE TRIAL PIT LOGS

Contract : Grandison Brook Client : ATKINS							Trench No. GBHP01	
Dates : 10/8/21 - 12/8/21 Location : Old Road / Tyla Road			Job Number : Q0560 Engineer : ATKINS		Ground Level : 10.88 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274497.09 E 195262.51 N <i>Co-ordinates to National Grid</i>			

m B.G.L.	Samples		Tests		Strata			WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	
1					0.15	TARMAC		
					0.15	MADE GROUND: Black slightly silty slightly sandy Gravel with high cobble content of sandstone and rare cobbles of slag. Gravel is angular to sub angular fine to coarse sandstone, siltstone, ash and slag.		10.73
					0.35			
					0.50			
					0.70	Orange brown slightly silty gravelly CLAY with low cobble content of sandstone. Gravel is sub angular to sub rounded fine to coarse sandstone.		10.38
				1.20	Trial trench terminated at 1.2mbgl.			9.68

PLAN 		Groundwater: No groundwater encountered Stability: Stable Shoring: None		Remarks: Hole marked out using co-ordinates and plan supplied by client. Area CAT and Genny scanned together with PAS128 Survey, STATS plans checked and permit to excavate issued by QGL. On completion hole backfilled with suitable arisings and type 1 imported sub-base compacted in layers with hot rolled asphalt at surface.	
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Equipment Used: 2Tonne tracked excavator and Various hand tools						
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		JL & AW	A Jones	1 Of 3	3.5		

Contract : Grandison Brook

Client : ATKINS

Trench No.

GBHP01

Dates : 10/8/21 - 12/8/21

Job Number : Q0560

Ground Level : 10.88 m A.O.D.
Level to Ordnance Datum

Location : Old Road / Tyla Road

Engineer : ATKINS

Coordinates: 274497.09 E
195262.51 N
Co-ordinates to National Grid



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email: enquiries@quantumgeotech.co.uk

Operator:
JL & AW

Logged By:
A Jones

Sheet No.
2 Of 3

m Per
Page
3.5

All measurements in
metres unless
otherwise stated



Contract : Grandison Brook Client : ATKINS		Trench No. GBHP01	
Dates : 10/8/21 - 12/8/21 Location : Old Road / Tyla Road	Job Number : Q0560 Engineer : ATKINS	Ground Level : 10.88 m A.O.D. <i>Level to Ordnance Datum</i>	Coordinates: 274497.09 E 195262.51 N <i>Co-ordinates to National Grid</i>



	Plas Newydd, Llanedi, Pontarddulais, Swansea SA4 0FQ Tel: 01554 744880 email: enquiries@quantumgeotech.co.uk	Operator: JL & AW	Logged By: A Jones	Sheet No. 3 Of 3	m Per Page 3.5	All measurements in metres unless otherwise stated	

HOUSE

GRASS

HP01

FOOTPATH

50mm grey duct @ 0.4m
Concrete over 3no 75mm green duct @ 0.25
H.V. cable @ 0.5m
40mm Water Feed @ 0.6m
100mm grey duct @ 0.5m
LV cable @ 0.3m

CURB

CONCRETE OVER STORM DRAIN @ 0.1m

Concrete @ 0.1m over comms cables

75mm plastic gas @ 0.7m
6 inch cast water @ 1.05m
10 inch day pipe @ 1.2m

40mm water Feed @ 0.8m

CENTRE WHITE LINE

MAN HOLE

6 inch cast water pipe @ 1.0m

2 No white 100mm ducts @ 0.6m

JUNCTION WHITE LINE

Concrete drain @ 0.1m (300mm wide)

3no 120mm Clay ducts @ 0.65m

3no 100mm Grey ducts @ 0.5m

700mm concrete over 3no green ducts @ 0.3m

300mm concrete encasing electric @ 0.1m

CURB

FOOTPATH

3no 75mm Green ducts under 150mm concrete @ 0.4m

H.V. Cable @ 0.55m

5mm copper cable @ 0.55m (possible earthing cable)

15mm LV. cable @ 0.3m

CURB

SCHOOL FENCE

NOT TO SCALE

Contract : Grandison Brook Client : ATKINS							Trench No. GBHP01A	
Dates : 12/8/21 - 13/8/21 Location : Entrance to Llansawel FC			Job Number : Q0560 Engineer : ATKINS		Ground Level : 10.98 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274510.32 E 195248.18 N <i>Co-ordinates to National Grid</i>			

m B.G.L.	Samples		Tests		Strata			WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	
1					0.15	TOPSOIL: Brown silty slightly gravelly Sand. Sand is fine to coarse.		
					0.15	(Verge only) TARMAC in track from 0-0.15mbgl		10.83
					0.25	MADE GROUND: Dark grey slightly silty sandy Gravel with medium cobble content of sandstone. Gravel is angular to sub angular fine to coarse sandstone, ash and slag.		
					0.40	MADE GROUND: Dark brownish grey slightly sandy slightly gravelly Silt / Clay with low cobble content of sandstone. Gravel is angular to sub angular fine to coarse sandstone, tile, clay pipe and plastic.		10.58
					0.50			
					0.90	Orange brown slightly clayey slightly sandy GRAVEL with high cobble and low boulder content of sandstone. Gravel is sub angular to sub rounded fine to coarse sandstone.		10.08
					0.30			
					1.20	Trench terminated at 1.2mbgl		9.78

PLAN 		Groundwater: No groundwater encountered Stability: Stable Shoring: None		Remarks: Hole marked out using co-ordinates and plan supplied by client. Area CAT and Genny scanned together with PAS128 Survey, STATS plans checked and permit to excavate issued by QGL. On completion hole backfilled with suitable arisings and type 1 imported sub-base compacted in layers with hot rolled asphalt at surface.	
-----------------	--	---	--	--	--

Equipment Used: 2Tonne tracked excavator and Various hand tools						
---	--	--	--	--	--	--

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Contract : Grandison Brook

Client : ATKINS

Trench No.

GBHP01A

Dates : 12/8/21 - 13/8/21

Job Number : Q0560

Ground Level : 10.98 m A.O.D.
Level to Ordnance Datum

Location : Entrance to Llansawel FC

Engineer : ATKINS

Coordinates: 274510.32 E
195248.18 N
Co-ordinates to National Grid



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JL & AW

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A Jones

Sheet No.
2 Of 3

**m Per
Page**
3.5

All measurements in
metres unless
otherwise stated



Contract : Grandison Brook

Client : ATKINS

Trench No.

GBHP01A

Dates : 12/8/21 - 13/8/21

Job Number : Q0560

Ground Level : 10.98 m A.O.D.
Level to Ordnance Datum

Location : Entrance to Llansawel FC

Engineer : ATKINS

Coordinates: 274510.32 E
195248.18 N
Co-ordinates to National Grid



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Operator:
JL & AW

Logged By:
A Jones

Sheet No.
3 Of 3

m Per
Page
3.5

All measurements in
metres unless
otherwise stated



HOUSE

HP01A

WALL

GRASS VERGE

30mm L.V. cable @ 0.4m

CURB

LANE

4 inch Clay pipe @ 0.75m

25mm L.V. cable @ 0.9m

8 inch cast pipe @ 0.8m

22mm plastic duct @ 0.55m

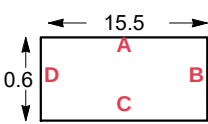
50mm H.V. cable @ 0.2m

CURB

NOT TO SCALE

Contract : Grandison Brook Client : ATKINS							Trench No. GBHP02	
Dates : 16/8/21 - 17/8/21 Location : Ynysmaerdy Road			Job Number : Q0560 Engineer : ATKINS		Ground Level : 22.05 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274807.19 E 195112.28 N <i>Co-ordinates to National Grid</i>			

m B.G.L.	Samples		Tests		Strata			WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	
1	0.50 -	ES1			0.20	TARMAC		
					0.20	MADE GROUND: Pale brownish grey slightly silty slightly sandy Gravel. Gravel is angular to sub angular fine to coarse sandstone. (Sub-Base)		21.85
	1.00 -	ES2			0.10	MADE GROUND: Black slightly silty slightly sandy Gravel with low cobble content of sandstone and slag. Gravel is angular to sub angular fine to coarse sandstone, siltstone, ash and slag. PID @ 0.5mbgl = 2.3ppm		21.75
					0.30			
					0.40	Brown silty slightly gravelly SAND. Sand is fine to coarse. PID @ 1.0mbgl = 0.1ppm		21.35
					0.70			
		1.20	Trial trench terminated at 1.2mbgl. Western half of pit Sub-base from 0.2m to 1.2mbgl, over plastic drainage pipe.		20.85			

PLAN 	Groundwater: No groundwater encountered Stability: Stable Shoring: None	Remarks: Hole marked out using co-ordinates and plan supplied by client. Area CAT and Genny scanned together with PAS128 Survey, STATS plans checked and permit to excavate issued by QGL. On completion hole backfilled with suitable arisings and type 1 imported sub-base compacted in layers with hot rolled asphalt at surface.
--	---	--

Equipment Used: 2Tonne tracked excavator and Various hand tools							
---	--	--	--	--	--	--	--

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Contract : Grandison Brook Client : ATKINS		Trench No. GBHP02	
Dates : 16/8/21 - 17/8/21 Location : Ynysmaerdy Road	Job Number : Q0560 Engineer : ATKINS	Ground Level : 22.05 m A.O.D. <i>Level to Ordnance Datum</i>	Coordinates: 274807.19 E 195112.28 N <i>Co-ordinates to National Grid</i>



	Plas Newydd, Llanedi, Pontarddulais, Swansea SA4 0FQ Tel: 01554 744880 email: enquiries@quantumgeotech.co.uk	Operator:	Logged By:	Sheet No.	m Per Page	All measurements in metres unless otherwise stated	
		JL & AW	A Jones	2 Of 3	3.5		

Contract : Grandison Brook

Client : ATKINS

Trench No.

GBHP02

Dates : 16/8/21 - 17/8/21

Job Number : Q0560

Ground Level : 22.05 m A.O.D.
Level to Ordnance Datum

Location : Ynysmaerdy Road

Engineer : ATKINS

Coordinates: 274807.19 E
195112.28 N
Co-ordinates to National Grid



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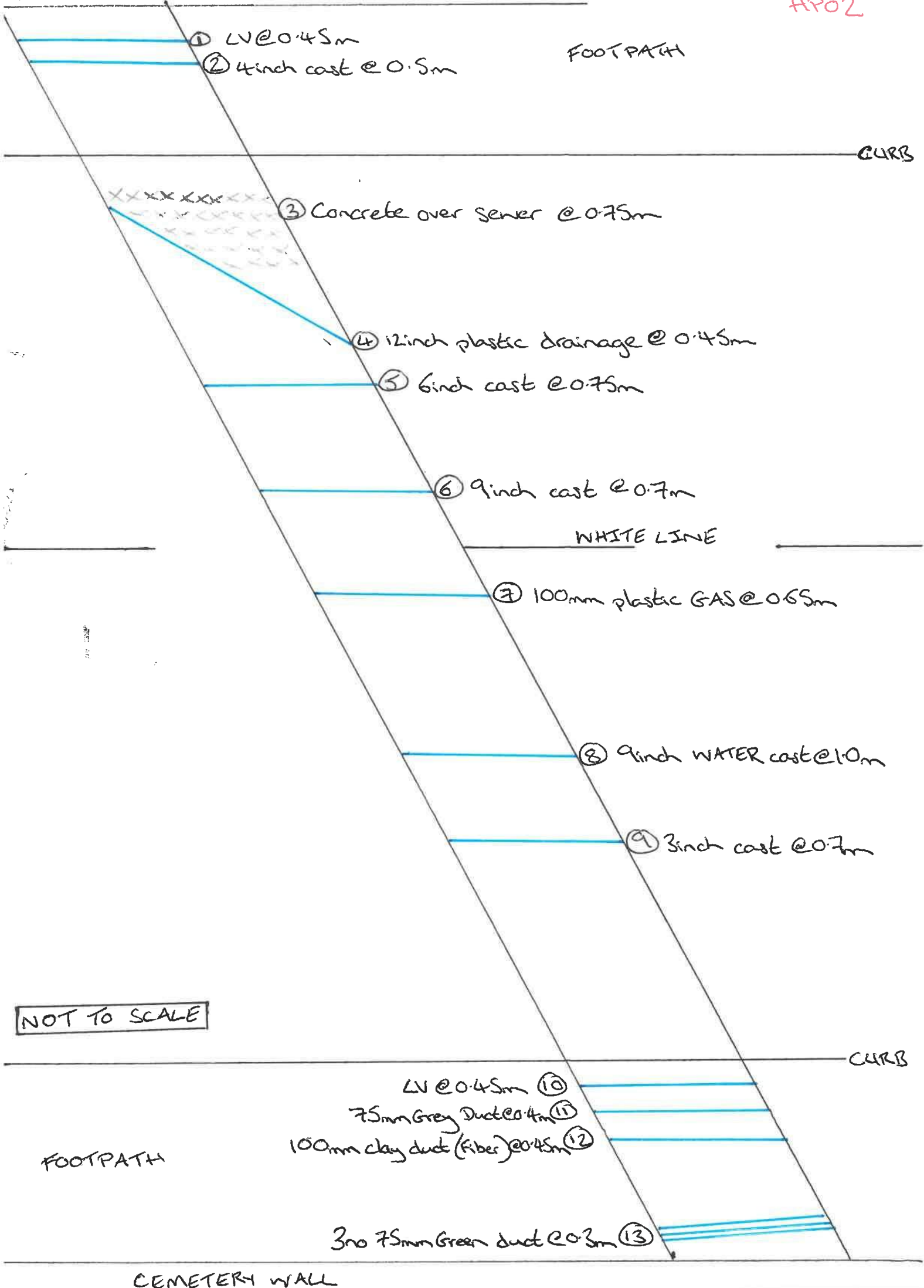
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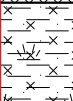
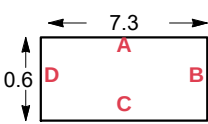
All measurements in
metres unless
otherwise stated



PLAYING FIELD WALL

HPO2



Contract : Grandison Brook Client : ATKINS							Trench No. GBHP03					
Dates : 18/8/21 - 19/8/21 Location : Brook Crescent			Job Number : Q0560 Engineer : ATKINS		Ground Level : 5.42 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274264.72 E 195516.16 N <i>Co-ordinates to National Grid</i>							
m B.G.L.	Samples		Tests		Strata			Red. Level A.O.D.	WATER			
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend					
1	0.40 -	ES1			0.05	TARMAC		5.37				
					0.05	MADE GROUND: Black slightly silty slightly sandy GRAVEL with low cobble content. Gravel is angular to sub angular fine to coarse sandstone, siltstone, ash and slag.						
					0.85	PID @ 0.4mbgl = 2.1ppm						
					0.90	Dark grey slightly silty sandy organic CLAY with peat.		4.52				
					0.30							
					1.20	Trial pit terminated at 1.2mbgl (In		4.22				
PLAN 			Groundwater: No groundwater encountered Stability: Stable Shoring: None			Remarks: Hole marked out using co-ordinates and plan supplied by client. Area CAT and Genny scanned together with PAS128 Survey, STATS plans checked and permit to excavate issued by QGL. On completion hole backfilled with suitable arisings and type 1 imported sub-base compacted in layers with hot rolled asphalt at surface.						
Equipment Used: 2Tonne tracked excavator and Various hand tools												
 Plas Newydd, Llanedi, Pontarddulais, Swansea SA4 0FQ Tel: 01554 744880 email: enquiries@quantumgeotech.co.uk			Operator: JL & AW		Logged By: A Jones		Sheet No. 1 Of 3		m Per Page 3.5		All measurements in metres unless otherwise stated 	

Contract : Grandison Brook Client : ATKINS		Trench No. GBHP03
Dates : 18/8/21 - 19/8/21 Location : Brook Crescent	Job Number : Q0560 Engineer : ATKINS	Ground Level : 5.42 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274264.72 E 195516.16 N <i>Co-ordinates to National Grid</i>



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		Form Name: TP LOG. Version 2.11.100, 27/11/20 Output By: Arwel Jones. Library File: C:\USERS\ARWEL JONES\QUANTUM GEOTECHNIC LTD\QUANTUM GEOTECHNICAL - COMPANY\GINT\QUANTUM\LIBRARY\Q					

Contract : Grandison Brook

Client : ATKINS

Trench No.

GBHP03

Dates : 18/8/21 - 19/8/21

Job Number : Q0560

Ground Level : 5.42 m A.O.D.
Level to Ordnance Datum

Location : Brook Crescent

Engineer : ATKINS

Coordinates: 274264.72 E
195516.16 N
Co-ordinates to National Grid



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Sheet No.
3 Of 3

m Per
Page
3.5

All measurements in
metres unless
otherwise stated



WOODEN FENCE

GRASS VERGE

CURB

FOOTPATH

50mm Orange Duct @ 0.2m
20mm Green Duct @ 0.4m

100mm Black Plastic Pipe @ 0.75m

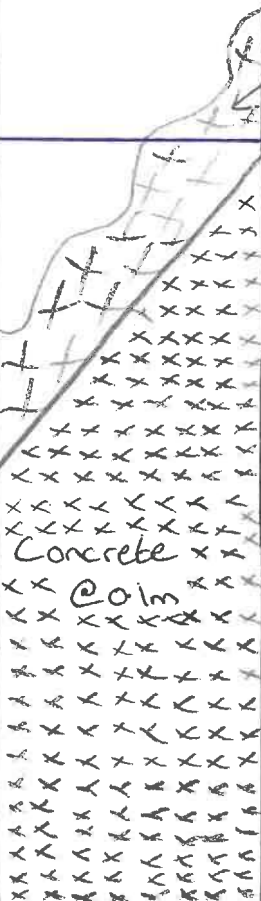
2 No 75mm Ducts @ 0.25m

CURB

Rough concrete @ 0.5m

150mm Green Duct @ 0.3m

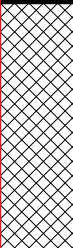
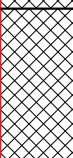
CARRIAGEWAY

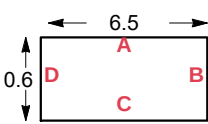


CULVERT

NOT TO SCALE

Contract : Grandison Brook Client : ATKINS							Trench No. GBHP04	
Dates : 5/8/21 - 6/8/21 Location : A474 Pant yr Heol			Job Number : Q0560 Engineer : ATKINS		Ground Level : 5.45 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274297.33 E 195517.88 N <i>Co-ordinates to National Grid</i>			

m B.G.L.	Samples		Tests		Strata			WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	
1					0.15	TARMAC		
					0.15	MADE GROUND: Black slightly silty sandy Gravel with medium cobble content of sandstone and slag. Gravel is angular to sub angular fine to coarse sandstone, ash and slag.		5.30
					0.65			
					0.80			
					0.40	MADE GROUND: Brown slightly silty sandy Gravel with low cobble content of sandstone. Gravel is angular to sub angular fine to coarse sandstone and siltstone with rare ash and clay pipe.		4.65
				1.20	Trial Trench terminated at 1.2mbgl In eastern edge of trench (under carriageway, concrete encountered at 0.1mbgl, breaking of concrete terminated at 0.5mbgl to avoid damage to gas main recorded.			4.25

PLAN 		Groundwater: No groundwater encountered Stability: Stable Shoring: None		Remarks: Hole marked out using co-ordinates and plan supplied by client. Area CAT and Genny scanned together with PAS128 Survey, STATS plans checked and permit to excavate issued by QGL. On completion hole backfilled with suitable arisings and type 1 imported sub-base compacted in layers with hot rolled asphalt at surface.	
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Equipment Used: 2Tonne tracked excavator and Various hand tools					
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		JL & AW	A Jones	1 Of 2	3.5		

Contract : Grandison Brook

Client : ATKINS

Trench No.

GBHP04

Dates : 5/8/21 - 6/8/21

Job Number : Q0560

Ground Level : 5.45 m A.O.D.
Level to Ordnance Datum

Location : A474 Pant yr Heol

Engineer : ATKINS

Coordinates: 274297.33 E
195517.88 N
Co-ordinates to National Grid



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HOUSE

HERAS FENCE

200mm Clay pipe @ 0.8m

2x 100mm ducts @ 0.25m

50mm Electric @ 0.5m

Concrete @ 0.5m

300mm Gas Duct pipe @ 0.15m

Re-inforced
Concrete @ 0.08m

CURB

Concrete @ 0.1m

Gas warning tape @ 0.1m over concrete.

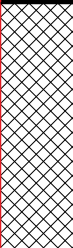
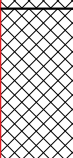
Concrete @ 0.1m

Dug to 0.5m through concrete,
gas encased in concrete Not Found.

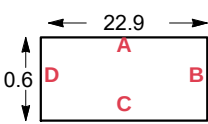
PARKING BAY WHITE LINE

NOT TO SCALE

Contract : Grandison Brook Client : ATKINS							Trench No. GBHP05	
Dates : 4/8/21 - 6/8/21 Location : A474 Pant yr Heol			Job Number : Q0560 Engineer : ATKINS		Ground Level : 5.60 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274303.27 E 195503.90 N <i>Co-ordinates to National Grid</i>			

m B.G.L.	Samples		Tests		Strata			WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	
1					0.15	TARMAC		
					0.15	MADE GROUND: Black slightly silty sandy Gravel with medium cobble content of sandstone and slag. Gravel is angular to sub angular fine to coarse sandstone, ash and slag. PID @ 0.5mbgl = 1.8ppm		5.45
					0.65			
					0.80			
					0.40	MADE GROUND: Brown slightly silty sandy Gravel with low cobble content of sandstone. Gravel is angular to sub angular fine to coarse sandstone and siltstone with rare ash and clay pipe.		4.80
				1.20	Trial Trench terminated at 1.2mbgl In eastern edge of trench terminated at 0.6mbgl unable to proceed safely through fused slag.			4.40

PLAN



Groundwater: Water encountered around 7no clay ducts at 0.6mbgl

Stability: Stable

Shoring: None

Remarks: Hole marked out using co-ordinates and plan supplied by client. Area CAT and Genny scanned together with PAS128 Survey, STATS plans checked and permit to excavate issued by QGL. On completion hole backfilled with suitable arisings and type 1 imported sub-base compacted in layers with hot rolled asphalt at surface.

Equipment Used: 2Tonne tracked excavator and Various hand tools

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		JL & AW	A Jones	1 Of 3	3.5		

Contract : Grandison Brook Client : ATKINS		Trench No. GBHP05
Dates : 4/8/21 - 6/8/21 Location : A474 Pant yr Heol	Job Number : Q0560 Engineer : ATKINS	Ground Level : 5.60 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274303.27 E 195503.90 N <i>Co-ordinates to National Grid</i>



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Contract : Grandison Brook

Client : ATKINS

Trench No.

GBHP05

Dates : 4/8/21 - 6/8/21

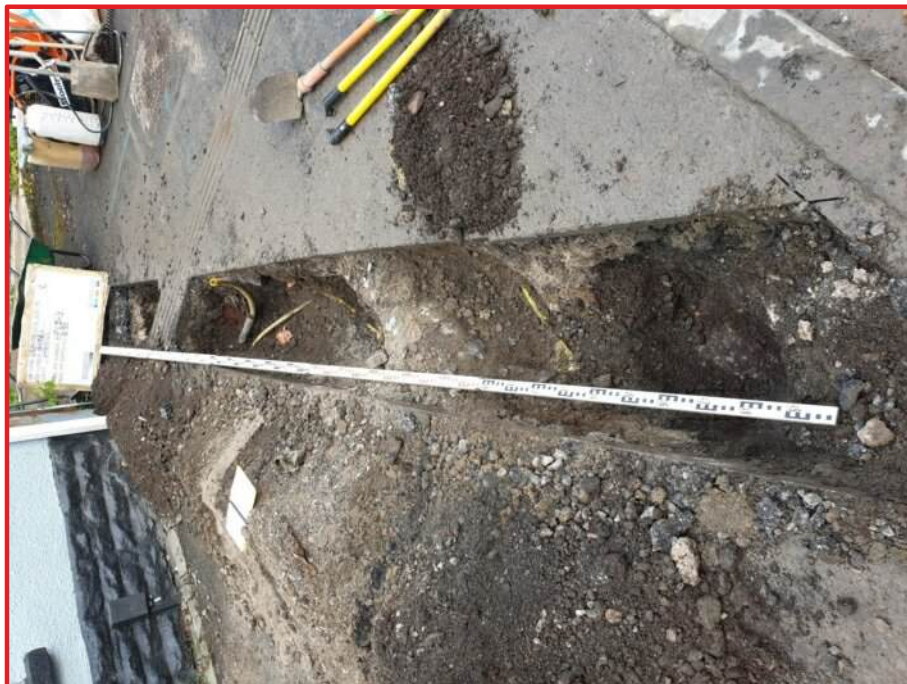
Job Number : Q0560

Ground Level : 5.60 m A.O.D.
Level to Ordnance Datum

Location : A474 Pant yr Heol

Engineer : ATKINS

Coordinates: 274303.27 E
195503.90 N
Co-ordinates to National Grid



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Operator:
JL & AW

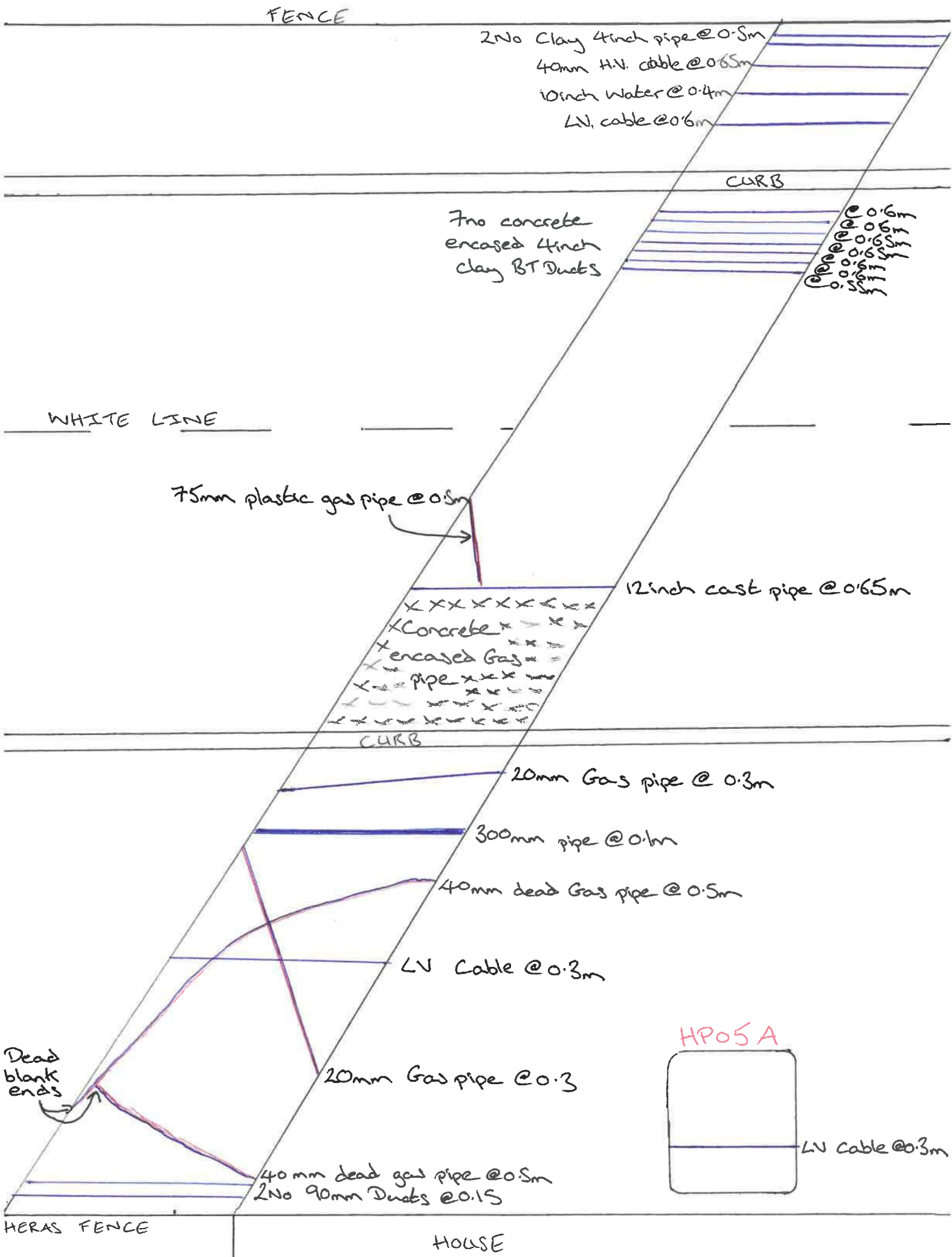
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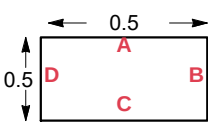
All measurements in
metres unless
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Contract : Grandison Brook Client : ATKINS							Trench No. GBHP05A	
Dates : 18/8/21 - 18/8/21 Location : A474 Pant yr Heol			Job Number : Q0560 Engineer : ATKINS		Ground Level : 5.58 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274295.47 E 195511.51 N <i>Co-ordinates to National Grid</i>			

m B.G.L.	Samples		Tests		Strata			WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	
					0.15	TARMAC		
					0.15	MADE GROUND: Black slightly silty sandy Gravel with medium cobble content of sandstone and slag. Gravel is angular to sub angular fine to coarse sandstone, ash and slag. Pit terminated at 0.3mbgl on location of service.		5.43
					0.15			
					0.30			5.28

PLAN 		Groundwater: No groundwater encountered Stability: Stable Shoring: None		Remarks: Hole marked out using co-ordinates and plan supplied by client. Area CAT and Genny scanned together with PAS128 Survey, STATS plans checked and permit to excavate issued by QGL. On completion hole backfilled with suitable arisings and type 1 imported sub-base compacted in layers with hot rolled asphalt at surface.	
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Equipment Used: Various hand tools						
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Contract : Grandison Brook

Client : ATKINS

Trench No.

GBHP05A

Dates : 18/8/21 - 18/8/21

Job Number : Q0560

Ground Level : 5.58 m A.O.D.
Level to Ordnance Datum

Location : A474 Pant yr Heol

Engineer : ATKINS

Coordinates: 274295.47 E
195511.51 N
Co-ordinates to National Grid



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APPENDIX IV – MACHINE EXCAVATED TRIAL PIT LOGS

Contract : Grandison Brook Client : ATKINS						Trial Pit No. GBTP01	
Dates : 7/7/21 - 7/7/21 Location : Llansawel F.C.			Job Number : Q0560 Engineer : ATKINS		Ground Level : 13.66 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274579.60 E 195215.24 N <i>Co-ordinates to National Grid</i>		

m B.G.L.	Samples		Tests		Strata			WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	
1					0.05	Artificial grass over MADE GROUND: Grey GRAVEL. Gravel is angular fine to medium limestone.		13.61
					0.05			
					0.03	MADE GROUND: Broken CONCRETE slabs.		13.58
	0.20 - 0.30	B1			0.08	MADE GROUND: Orange brown slightly silty Sand. Sand is fine to coarse		13.51
	0.30 -	ES2			0.07			
					0.15	MADE GROUND: Grey clayey slightly sandy Gravel with low cobble content of sandstone and brick. Gravel is angular to sub angular fine to coarse sandstone and siltstone.		13.31
	0.50 -	ES3			0.20			
	0.50 - 0.70	B4			0.35	PID @0.3mbgl = 0.0ppm		
					0.35	MADE GROUND: Dark grey slightly clayey slightly; y sandy gravelly Silt. Gravel is angular to sub angular fine to coarse sandstone and siltstone with glass and fine coal.		12.96
	0.80 - 1.00	B5			0.70	PID @0.5mbgl = 0.3ppm		
2					0.55	Orange brown sandy slightly gravelly SILT with low cobble content of sandstone.		
	1.10 -	ES6				PID @1.1mbgl = 0.0ppm		
	1.30 - 1.80	B7			1.25	Orange brown slightly silty sandy GRAVEL with low cobble content of sandstone. Gravel is angular to sub rounded fine to coarse sandstone.		12.41
					0.80			
				2.05	Trial pit terminated at 2.05mbgl at maximum reach of excavator.			11.61

PLAN 	Groundwater: No groundwater encountered Stability: Stable Shoring: None	Remarks: Hole marked out using co-ordinates supplied by client. Area CAT and Genny scanned, STATS plans checked and permit to excavate issued by QGL. On completion hole backfilled with arisings compacted in layers with astro turf replaced at surface.
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Equipment Used: 3T 360 tracked excavator (Toothless bucket)							
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Contract : Grandison Brook

Client : ATKINS

Trial Pit No.

GBTP01

Dates : 7/7/21 - 7/7/21

Job Number : Q0560

Ground Level : 13.66 m A.O.D.
Level to Ordnance Datum

Location : Llansawel F.C.

Engineer : ATKINS

Coordinates: 274579.60 E
195215.24 N
Co-ordinates to National Grid



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Contract : Grandison Brook Client : ATKINS							Trial Pit No. GBTP02	
Dates : 5/7/21 - 5/7/21 Location : Briton Ferry RFC			Job Number : Q0560 Engineer : ATKINS		Ground Level : 18.15 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274730.69 E 195151.13 N <i>Co-ordinates to National Grid</i>			

m B.G.L.	Samples		Tests		Strata				WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	Red. Level A.O.D.	
1	0.30 - 0.40	ES1			0.35	Turf over TOPSOIL: Dark brown slightly gravelly silty Sand.			
	0.40 - 0.60	B2			0.35	PID @0.3mbgl = 0.0ppm MADE GROUND: Brown sandy slightly gravelly SILT / CLAY with low cobble content of brick.		17.80	
					0.35	PID @0.6mbgl = 1.6ppm			
	1.00 - 1.50	ES4 B5			0.70	Orange brown slightly silty sandy GRAVEL with low cobble content of sandstone. Gravel is angular to sub angular fine to coarse sandstone. PID @1.0mbgl = 0.0ppm		17.45	
1.90 - 2.40	B6			2.30	with low boulder content of sandstone from 1.7mbgl				
					from 1.9mbgl gravel becoming sub angular to sub rounded sandstone with medium cobble content.				
2.80 - 3.00	B7			3.00	Trial Pit terminated at 3.0mbgl (scheduled depth)		15.15		

PLAN 	Groundwater: Seepage at 1.7mbgl; Slow groundwater ingress at 1.9mbgl. Stability: Slight collapse to sides below 2.0mbgl Shoring: None	Remarks: Hole marked out on site with clients engineer. Area CAT and Genny scanned, STATS plans checked and permit to excavate issued by QGL. On completion hole backfilled with arisings compacted in layers with turf at surface.
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Equipment Used: 8T 360 wheeled excavator (toothless bucket)						
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Contract : Grandison Brook

Client : ATKINS

Trial Pit No.

GBTP02

Dates : 5/7/21 - 5/7/21

Job Number : Q0560

Ground Level : 18.15 m A.O.D.
Level to Ordnance Datum

Location : Briton Ferry RFC

Engineer : ATKINS

Coordinates: 274730.69 E
195151.13 N
Co-ordinates to National Grid



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Contract : Grandison Brook Client : ATKINS							Trial Pit No. GBTP03	
Dates : 5/7/21 - 5/7/21 Location : Briton Ferry RFC			Job Number : Q0560 Engineer : ATKINS		Ground Level : 20.52 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274787.85 E 195124.03 N <i>Co-ordinates to National Grid</i>			

m B.G.L.	Samples		Tests		Strata			WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	
1	0.30 - 0.30 - 0.40	ES1 B2			0.10	Turf over TOPSOIL: Dark brown slightly gravelly silty Sand.		20.42
					0.10	MADE GROUND: Dark brown slightly silty sandy Gravel with low cobble content of sandstone and brick. Gravel is angular to sub angular fine to coarse sandstone and brick with glass.		
	0.50 - 0.60 - 0.80	D3 ES4 B5			0.35	PID @0.3mbgl = 0.0ppm		
					0.45	Pale brown slightly gravelly sandy SILT with low cobble content of sandstone.		20.07
	0.35	PID @0.6mbgl = 2.3ppm						
1.00 - 1.00 - 1.50	ES6 B7	0.80	Orange brown slightly silty sandy GRAVEL with low cobble content of sandstone. Gravel is angular to sub angular fine to coarse sandstone.		19.72			
		1.10						
2	2.00 - 2.50	B8	1.90	Grey slightly silty sandy GRAVEL with medium cobble content of sandstone. Gravel is sub angular to sub rounded fine to coarse sandstone.		18.62		
			1.10					
3			3.00	Trial Pit terminated at 3.0mbgl (scheduled depth)			17.52	

PLAN 	Groundwater: No groundwater encountered Stability: Stable Shoring: None	Remarks: Hole marked out using co-ordinates supplied by client. Area CAT and Genny scanned, STATS plans checked and permit to excavate issued by QGL. On completion hole backfilled with arisings compacted in layers with turf at surface.
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Equipment Used: 8T 360 wheeled excavator (toothless bucket)

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Contract : Grandison Brook

Client : ATKINS

Trial Pit No.

GBTP03

Dates : 5/7/21 - 5/7/21

Job Number : Q0560

Ground Level : 20.52 m A.O.D.
Level to Ordnance Datum

Location : Briton Ferry RFC

Engineer : ATKINS

Coordinates: 274787.85 E
195124.03 N
Co-ordinates to National Grid



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otherwise stated



Contract : Grandison Brook Client : ATKINS							Trial Pit No. GBTP04	
Dates : 15/11/21 - 15/11/21 Location : Land west of railway line			Job Number : Q0560 Engineer : ATKINS		Ground Level : 4.88 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274156.48 E 195612.41 N <i>Co-ordinates to National Grid</i>			

m B.G.L.	Samples		Tests		Strata				WATER	
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	Red. Level A.O.D.		
1	0.20 - 0.50	B1			0.10	TOPSOIL: Black sandy clayey SILT with rootlets.		4.78		
					0.10	MADE GROUND: Dark grey silty slightly sandy gravelly CLAY. Gravel is angular to sub angular fine to medium siltstone, sandstone, coal and rare pottery.				
	0.50 -	ES7			0.60	PID @ 0.5mbgl = 0.9ppm		4.18		
					0.70	Very Soft grey slightly silty slightly organic CLAY.				
	1.00 - 1.00 - 1.50	ES2 B3			1.80	PID @ 1.0mbgl = 0.0ppm		2.38		
2	2.00 -	D4			2	Vane - P=10 - R=6kN/m2 Vane - P=12 - R=8kN/m2 Vane - P=16 - R=8kN/m2				
	2.50 - 3.00	B5	2.50	Very Soft grey slightly silty sandy slightly organic CLAY.						
			0.50							
3	3.00 -	D6	3	Vane - P=18 - R=10kN/m2 Vane - P=12 - R=8kN/m2 Vane - P=14 - R=8kN/m2	3.00	Hole terminated at scheduled depth of 3.0mbgl		1.88		

PLAN 	Groundwater: No groundwater encountered Stability: Stable Shoring: None	Remarks: Hole marked out on site with clients engineer. Area CAT and Genny scanned, STATS plans checked and permit to excavate issued by QGL. On completion hole backfilled with arisings compacted in layers with turf at surface.
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Equipment Used: 9 tonne tracked excavator						
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Contract : Grandison Brook

Client : ATKINS

Trial Pit No.

GBTP04

Dates : 15/11/21 - 15/11/21

Job Number : Q0560

Ground Level : 4.88 m A.O.D.
Level to Ordnance Datum

Location : Land west of railway line

Engineer : ATKINS

Coordinates: 274156.48 E
195612.41 N
Co-ordinates to National Grid



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Contract : Grandison Brook Client : ATKINS							Trial Pit No. GBTP05	
Dates : 6/7/21 - 6/7/21 Location : Land to rear of Farm Rd.			Job Number : Q0560 Engineer : ATKINS		Ground Level : 5.47 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274214.61 E 195550.81 N <i>Co-ordinates to National Grid</i>			

m B.G.L.	Samples		Tests		Strata				WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	Red. Level A.O.D.	
1	0.10 - 0.30	B1				Turf over TOPSOIL: Brown slightly gravelly clayey Sand with many rootlets.			
	0.30 -	ES2			0.40	PID @0.3mbgl = 0.0ppm			
	0.50 -	ES3			0.40	MADE GROUND: Black silty slightly sandy Gravel with low cobble content of siltstone, brick and slag. Gravel is angular to sub angular fine to coarse siltstone, sandstone, ash, slag, brick and concrete, angular fine to medium coal with glass bottles and plastic. PID @0.5mbgl = 0.9ppm		5.07	
	0.50 - 1.00	B4							
	1.20 -	ES5				PID @1.2mbgl = 4.9ppm			
2	1.50 - 2.00	B6			2.10				
	2.20 -	ES7				PID @2.2mbgl = 4.5ppm			
	2.60 - 3.00	B8			2.50	Brown very fibrous PEAT.		2.97	
3	2.80 -	ES9			0.50	PID @2.8mbgl = 2.8ppm			
	3.00 -	D10			3.00	Trial Pit terminated at 3.0mbgl (scheduled depth)		2.47	

PLAN 		Groundwater: Medium groundwater ingress at 1.2mbgl Stability: Sides collapsing from 1.2-2.5mbgl Shoring: None	Remarks: Hole marked out using co-ordinates supplied by client. Area CAT and Genny scanned, STATS plans checked and permit to excavate issued by QGL. On completion hole backfilled with arisings compacted in layers with turf at surface.
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Equipment Used: 8T 360 wheeled excavator (toothless bucket)

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Contract : Grandison Brook

Client : ATKINS

Trial Pit No.

GBTP05

Dates : 6/7/21 - 6/7/21

Job Number : Q0560

Ground Level : 5.47 m A.O.D.
Level to Ordnance Datum

Location : Land to rear of Farm Rd.

Engineer : ATKINS

Coordinates: 274214.61 E
195550.81 N
Co-ordinates to National Grid



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SA4 0FQ
Tel: 01554 744880
email: enquiries@quantumgeotech.co.uk

Operator:
KC

Logged By:
A Jones

Sheet No.
2 Of 2

m Per
Page

All measurements in
metres unless
otherwise stated



Contract : Grandison Brook Client : ATKINS							Trial Pit No. GBTP06	
Dates : 6/7/21 - 6/7/21 Location : Land to rear of Farm Rd.			Job Number : Q0560 Engineer : ATKINS		Ground Level : 5.09 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274241.85 E 195528.64 N <i>Co-ordinates to National Grid</i>			

m B.G.L.	Samples		Tests		Strata			WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	
1	0.30 -	ES1			0.10	Turf over TOPSOIL: Brown slightly gravelly clayey Sand with many rootlets.		4.99
					0.10	MADE GROUND: Black silty slightly sandy Gravel with low cobble content of sandstone, brick and concrete. Gravel is angular to sub angular fine to coarse siltstone, sandstone, ash, brick and concrete, angular fine to medium coal with glass bottles and plastic. PID @0.3mbgl = 0.8ppm PID @0.5mbgl = 2.5ppm		
	0.50 - 0.50 - 1.00	ES B2			1.00			
	1.20 - 1.20 - 1.50	ES3 B4			1.10	MADE GROUND: Black sandy slightly gravelly SILT with low cobble content of brick. Gravel is angular to sub angular fine to coarse siltstone, sandstone and Fine coal with timber. ...with pocket of red sand at 1.2-1.4mbgl in south west corner of pit. PID @1.2mbgl = 5.3ppm		3.99
					0.40			
	1.80 - 1.80 - 2.00	ES5 B6			1.50	Brown very fibrous PEAT.		3.59
					0.60	PID @2.2mbgl = 3.6ppm		
	2.20 -	D7			2.10	Brown clayey slightly sandy fibrous PEAT		2.99
					0.30			
2.50 - 3.00	B8			2.40	Brown very fibrous PEAT.		2.69	
				0.60				
3				3.00	Trial Pit terminated at 3.0mbgl (scheduled depth)		2.09	

PLAN 	Groundwater: Seepage at 1.5mbgl. Stability: Stable Shoring: None	Remarks: Hole marked out using co-ordinates supplied by client. Area CAT and Genny scanned, STATS plans checked and permit to excavate issued by QGL. On completion hole backfilled with arisings compacted in layers with turf at surface.
-----------------	--	---

Equipment Used: 8T 360 wheeled excavator (toothless bucket)

Plas Newydd, Llanedi, Pontarddulais, Swansea SA4 0FQ Tel: 01554 744880 email: enquiries@quantumgeotech.co.uk	Operator: KC	Logged By: A Jones	Sheet No. 1 Of 2	m Per Page 3.5	All measurements in metres unless otherwise stated	
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Contract : Grandison Brook

Client : ATKINS

Trial Pit No.

GBTP06

Dates : 6/7/21 - 6/7/21

Job Number : Q0560

Ground Level : 5.09 m A.O.D.
Level to Ordnance Datum

Location : Land to rear of Farm Rd.

Engineer : ATKINS

Coordinates: 274241.85 E
195528.64 N
Co-ordinates to National Grid



Plas Newydd, Llanedi, Pontarddulais, Swansea
SA4 0FQ
Tel: 01554 744880
email: enquiries@quantumgeotech.co.uk

Operator:
KC

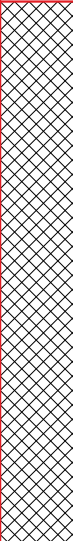
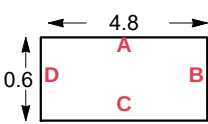
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A Jones

Sheet No.
2 Of 2

m Per
Page

All measurements in
metres unless
otherwise stated



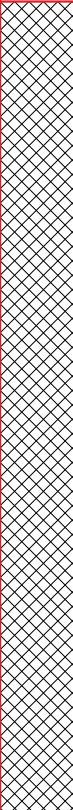
Contract : Grandison Brook Client : ATKINS							Trial Pit No. GBTP10		
Dates : 15/11/21 - 15/11/21 Location : Land west of railway line			Job Number : Q0560 Engineer : ATKINS		Ground Level : 4.88 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274126.85 E 195592.95 N <i>Co-ordinates to National Grid</i>				
m B.G.L.	Samples		Tests		Strata				WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	Red. Level A.O.D.	
1					1.40	MADE GROUND: Dark brown slightly silty sandy GRAVEL with high cobble content of concrete and brick. Gravel is angular to sub angular fine to coarse sandstone, limestone, concrete, brick and slag with fine coal and timber.			
					1.40	Hole terminated at 1.4mbgl unable to proceed due to fast groundwater ingress and sides collapsing.		3.48	
PLAN 			Groundwater: Fast groundwater ingress at 1.9mbgl Stability: Sides collapsing from 1.0 Shoring: None			Remarks: Hole marked out on site with clients engineer. Area CAT and Genny scanned, STATS plans checked and permit to excavate issued by QGL. On completion hole backfilled with arisings compacted in layers with turf at surface. Unable to locate service, hole terminated due to fast groundwater ingress.			
Equipment Used: 9 tonne tracked excavator									
 Plas Newydd, Llanedi, Pontarddulais, Swansea SA4 0FQ Tel: 01554 744880 email: enquiries@quantumgeotech.co.uk			Operator: DD		Logged By: A Jones		Sheet No. 1 Of 2		
					m Per Page 3.5		All measurements in metres unless otherwise stated		
									

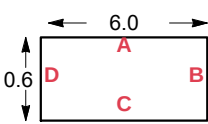
Contract : Grandison Brook Client : ATKINS		Trial Pit No. GBTP10	
Dates : 15/11/21 - 15/11/21 Location : Land west of railway line	Job Number : Q0560 Engineer : ATKINS	Ground Level : 4.88 m A.O.D. <i>Level to Ordnance Datum</i>	Coordinates: 274126.85 E 195592.95 N <i>Co-ordinates to National Grid</i>



	Plas Newydd, Llanedi, Pontarddulais, Swansea SA4 0FQ Tel: 01554 744880 email: enquiries@quantumgeotech.co.uk	Operator:	Logged By:	Sheet No.	m Per Page	All measurements in metres unless otherwise stated	
		DD	A Jones	2 Of 2			

Contract : Grandison Brook Client : ATKINS							Trial Pit No. GBTP10A	
Dates : 15/11/21 - 15/11/21 Location : Land west of railway line			Job Number : Q0560 Engineer : ATKINS		Ground Level : 5.31 m A.O.D. <i>Level to Ordnance Datum</i> Coordinates: 274128.68 E 195592.95 N <i>Co-ordinates to National Grid</i>			

m B.G.L.	Samples		Tests		Strata				WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	Red. Level A.O.D.	
1					2.10	MADE GROUND: Dark brown slightly silty sandy GRAVEL with high cobble content of concrete and brick. Gravel is angular to sub angular fine to coarse sandstone, limestone, concrete, brick and slag with fine coal and timber.			
2					2.10	MADE GROUND: Dark grey slightly silty slightly sandy CLAY with timber.		3.21	
					0.10 2.20	Unknown cast pipe at 2.1mbgl Hole terminated at 2.2mbgl unable to proceed due to fast groundwater ingress and sides collapsing.		3.11	

PLAN 		Groundwater: Fast groundwater ingress at 1.5mbgl Stability: Sides collapsing from 1.0mbgl Shoring: None		Remarks: Hole marked out on site with clients engineer. Area CAT and Genny scanned, STATS plans checked and permit to excavate issued by QGL. On completion hole backfilled with arisings compacted in layers with turf at surface. 6" unknown cast pipe located at 2.1m bgl. Unable to locate service required, hole terminated due to fast groundwater ingress.	
--	--	---	--	---	--

Equipment Used: 9 tonne tracked excavator					
---	--	--	--	--	--

	Plas Newydd, Llanedi, Pontarddulais, Swansea SA4 0FQ Tel: 01554 744880 email: enquiries@quantumgeotech.co.uk	Operator: DD	Logged By: A Jones	Sheet No. 1 Of 3	m Per Page 3.5	All measurements in metres unless otherwise stated	
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Contract : Grandison Brook

Client : ATKINS

Trial Pit No.

GBTP10A

Dates : 15/11/21 - 15/11/21

Job Number : Q0560

Ground Level : 5.31 m A.O.D.
Level to Ordnance Datum

Location : Land west of railway line

Engineer : ATKINS

Coordinates: 274128.68 E
195592.95 N
Co-ordinates to National Grid



Plas Newydd, Llanedi, Pontarddulais, Swansea
SA4 0FQ
Tel: 01554 744880
email: enquiries@quantumgeotech.co.uk

Operator:
DD

Logged By:
A Jones

Sheet No.
2 Of 3

m Per
Page

All measurements in
metres unless
otherwise stated



Contract : Grandison Brook

Client : ATKINS

Trial Pit No.

GBTP10A

Dates : 15/11/21 - 15/11/21

Job Number : Q0560

Ground Level : 5.31 m A.O.D.
Level to Ordnance Datum

Location : Land west of railway line

Engineer : ATKINS

Coordinates: 274128.68 E
195592.95 N
Co-ordinates to National Grid



Plas Newydd, Llanedi, Pontarddulais, Swansea
SA4 0FQ
Tel: 01554 744880
email: enquiries@quantumgeotech.co.uk

Operator:
DD

Logged By:
A Jones

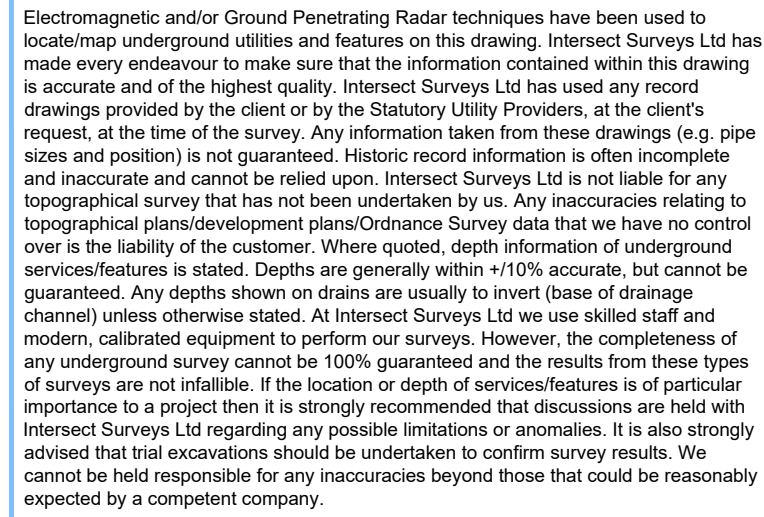
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All measurements in
metres unless
otherwise stated

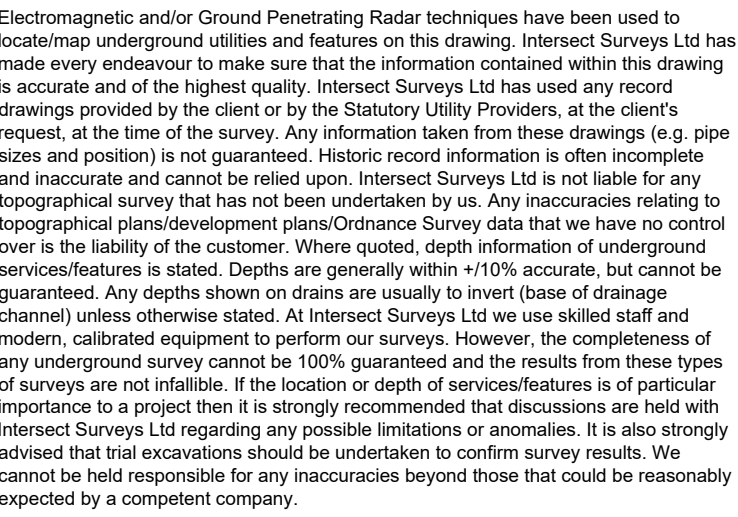


APPENDIX V – GPR SURVEY DRAWINGS

[illegible]

KEY			
	TV	TV	CCTV / CABLE TELEVISION
	450		COMBINED DRAINAGE
	COM	COM	COMMUNICATIONS CABLE
	A	A	COMPRESSED AIR
			DUCTING
	E	E	EARTH CABLE
	EOT		ELECTRIC CABLE
	150		END OF TRACE
	F	F	FOUL DRAINAGE
			FUEL PIPE
			GAS PIPE
	G	G	GAUGE LINE
	H	H	HEATING
	O	O	OFFSET FILL PIPE
			PUMPING MAIN
	R	R	RADAR AREA ANOMALY
			
	R	R	RADAR UTILITY TRACE
	300		SURFACE DRAINAGE
			SURVEY BOUNDARY
			TELECOM CABLE
	TL	TL	TRAFFIC LIGHTS
	U		UNIDENTIFIED
	VR	VR	VAPOUR RECOVERY
	V	V	VENT PIPE
			WATER PIPE
			O.S BENCH MARK
			SURVEY CONTROL STATION

Revision	Description	Date
Drawing Status: INFORMATION		
 T: 0208 399 3851 M: 07535 236 812 www.intersectsurveys.co.uk		
Client: QUANTUM GEOTECH		
Project: GRANDISON BROOK SITE 1		
Title: UNDERGROUND UTILITY SERVICES LAYOUT		
Drawn	Surveyed:	Date
A.J.O.	A.S.	AUG'21
Cad File:		Scale
001		1:200@A1
Drawing Number		Revision
45134-001		

[illegible]

KEY		
	TV	CCTV / CABLE TELEVISION
	COM	COMBINED DRAINAGE
	A	COMMUNES AIR
	E	DUCTING
	EOT	EARTH CABLE
	F	ELECTRIC CABLE
	G	END OF TRACE
	H	FOUL DRAINAGE
	O	FUEL PIPE
		GAS PIPE
	R	GAUGE LINE
	TL	HEATING
	U	OFFSET FILL PIPE
	VR	PUMPING MAIN
	V	
		RADAR AREA ANOMALY
	R	
		RADAR UTILITY TRACE
		SURFACE DRAINAGE
	TL	SURVEY BOUNDARY
	TL	TELECOM CABLE
	U	TRAFFIC LIGHTS
	VR	UNIDENTIFIED
	V	VAPOUR RECOVERY
	V	VENT PIPE
		WATER PIPE
		O/S BENCH MARK
		SURVEY CONTROL STATION

Revision	Description	Date
Drawing Status:		
INFORMATION		
		
T: 0208 399 3851 M: 07535 236 812 www.intersectsurveys.co.uk		
Client:		
QUANTUM GEOTECH		
Project:		
GROUND BROOK SITE 2		
Title:		
UNDERGROUND UTILITY SERVICES LAYOUT		
Drawn	Surveyed:	Date
A.J.O.	A.S.	AUG'21
Cad File:	Scale	
001	1:200@A1	
Drawing Number		Revision
45134-002		

APPENDIX VI – GEOTECHNICAL LABORATORY TEST RESULTS



Contract Number: 55495

Client Ref: **Q0560**

Report Date: **15-09-2021**

Client PO:

Client **Quantum Geotechnic Ltd**
Plas Newydd
Llanedi
Pontarddulais
Swansea
SA4 0FQ

Contract Title: **Grandison Brook**
For the attention of: **Arwel Jones**

Date Received: **25-08-2021**

Date Completed: **15-09-2021**

Test Description	Qty
Moisture Content of Soil BS1377 : Part 2 : Clause 3.2 : 1990 - * UKAS	11
4 Point Liquid & Plastic Limit BS 1377:1990 - Part 2 : 4.3 & 5.3 - * UKAS	2
PSD Wet & Dry Sieve method BS 1377:1990 - Part 2 : 9.2 - * UKAS	3
PSD: Sedimentation by pipette carried out with Wet Sieve (Wet Sieve must also be selected) BS 1377:1990 - Part 2 : 9.4 - * UKAS	3
Organic Matter Content-dichromate method Sub-contracted Test	2
BRE Suite D Brownfield Site (pyrite present) includes pH, water & acid soluble sulphate, total sulphur, magnesium, chloride and nitrate Sub-contracted Test - @ Non Accredited Test	4

Notes: Observations and Interpretations are outside the UKAS Accreditation

* - denotes test included in laboratory scope of accreditation

- denotes test carried out by approved contractor

@ - denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved Signatories:

Emma Sharp (Business Support Manager) - Paul Evans (Director) - Richard John (Quality/Technical Manager)

Shaun Jones (Laboratory manager) - Shaun Thomas (Site Manager) - Wayne Honey (Quality Assistant / Administrator / Health and Safety Coordinator)



Laboratory Report



GEO Site & Testing Services Ltd

Contract Number: 55495

Test Description	Qty
Samples Received	46
- @ Non Accredited Test	
Disposal of samples for job	1

Notes: Observations and Interpretations are outside the UKAS Accreditation

* - denotes test included in laboratory scope of accreditation

- denotes test carried out by approved contractor

@ - denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved Signatories:

Emma Sharp (Business Support Manager) - Paul Evans (Director) - Richard John (Quality/Technical Manager)

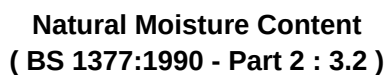
Shaun Jones (Laboratory manager) - Shaun Thomas (Site Manager) - Wayne Honey (Quality Assistant / Administrator / Health and Safety Coordinator)

GEO Site & Testing Services Ltd

Unit 3-4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN

Tel: 01554 784040 Fax: 01554 784041 info@gstl.co.uk gstl.co.uk





Contract Number

55495

Site Name

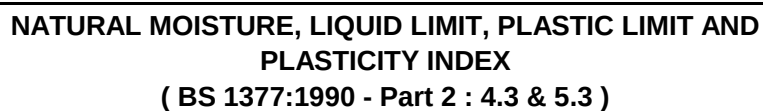
Grandison Brook

Date Tested

09/09/2021

Operators	Checked	15/09/2021	Richard John (Advanced Testing Manager)
Clayton Jenkins	Approved	15/09/2021	Paul Evans (Quality/Technical Manager)





Contract Number	55495	
Site Name	Grandison Brook	
Date Tested	09/09/2021	
	DESCRIPTIONS	

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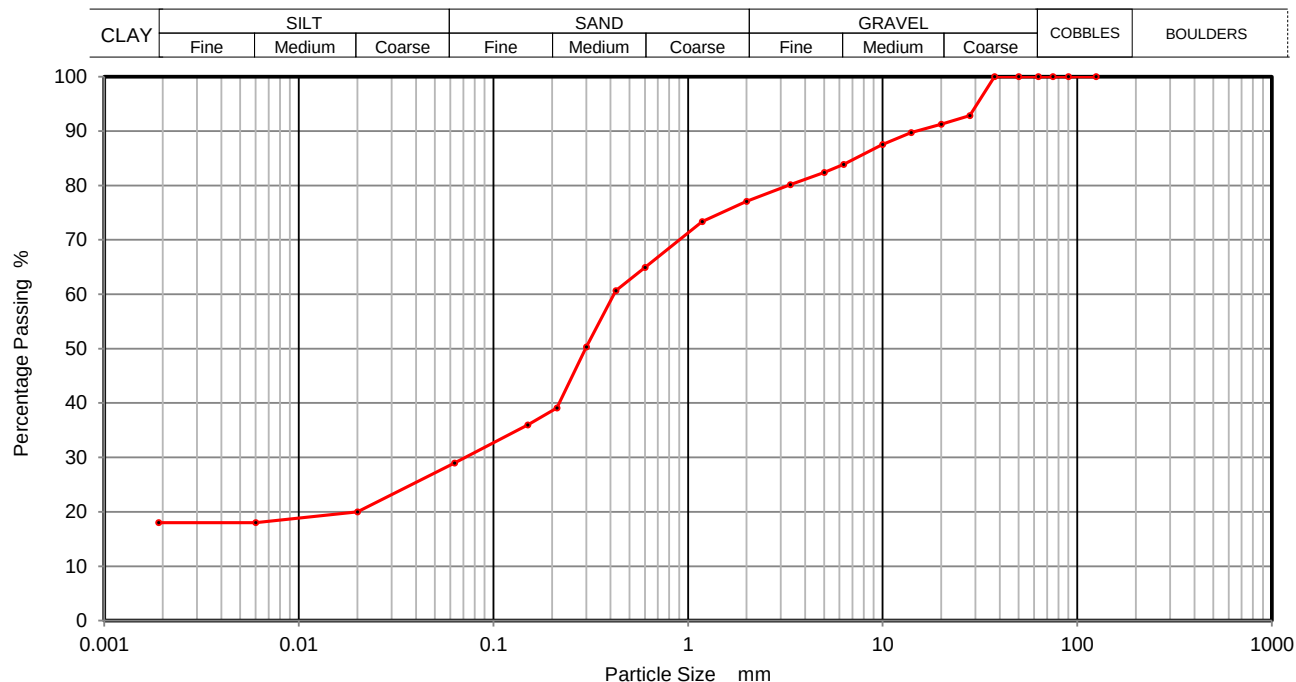
Operators	Checked	15/09/2021	Richard John (Advanced Testing Manager)
Clayton Jenkins	Approved	15/09/2021	Paul Evans (Quality/Technical Manager)





PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Contract Number	55495
	Borehole/Pit No. GBBH01
Site Name	Grandison Brook
Soil Description	Sample No. 1
	Depth Top 0.50
	Depth Base 0.70
Date Tested	09/09/2021
Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	20
90	100	0.0060	18
75	100	0.0020	18
63	100		
50	100		
37.5	100		
28	93		
20	91		
14	90		
10	88		
6.3	84		
5	82		
3.35	80		
2	77		
1.18	73		
0.6	65		
0.425	61		
0.3	50		
0.212	39		
0.15	36		
0.063	29		

Sample Proportions	% dry mass
Cobbles	0
Gravel	23
Sand	48
Silt	11
Clay	18

Remarks
 Preparation and testing in accordance with BS1377 unless noted below

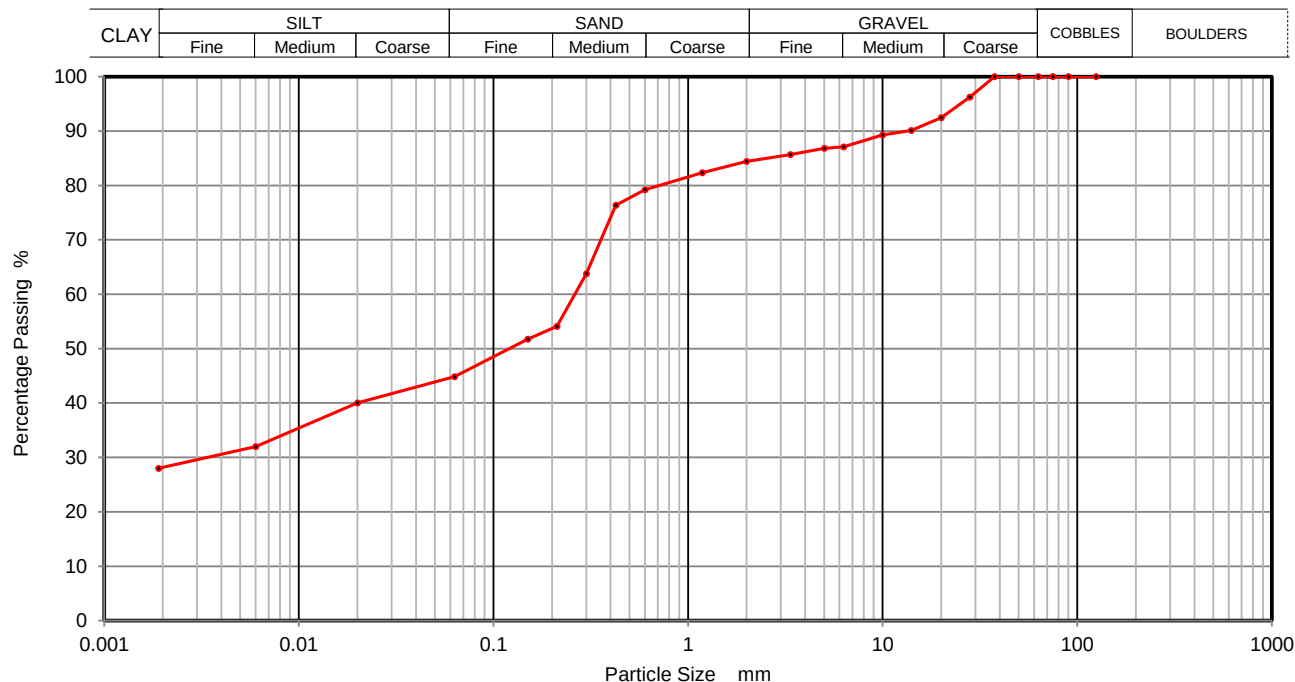
Operator	Checked	14/09/2021	Richard John	
David	Approved	15/09/2021	Paul Evans	





PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Contract Number	55495
	Borehole/Pit No. GBTP01
Site Name	Grandison Brook
Soil Description	Brown silty clayey fine to coarse gravelly SAND
Date Tested	09/09/2021
Sample No.	5
Depth Top	0.80
	Depth Base 1.00
Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	40
90	100	0.0060	32
75	100	0.0020	28
63	100		
50	100		
37.5	100		
28	96		
20	92		
14	90		
10	89		
6.3	87		
5	87		
3.35	86		
2	84		
1.18	82		
0.6	79		
0.425	76		
0.3	64		
0.212	54		
0.15	52		
0.063	45		

Sample Proportions	% dry mass
Cobbles	0
Gravel	16
Sand	39
Silt	17
Clay	28

Remarks
 Preparation and testing in accordance with BS1377 unless noted below

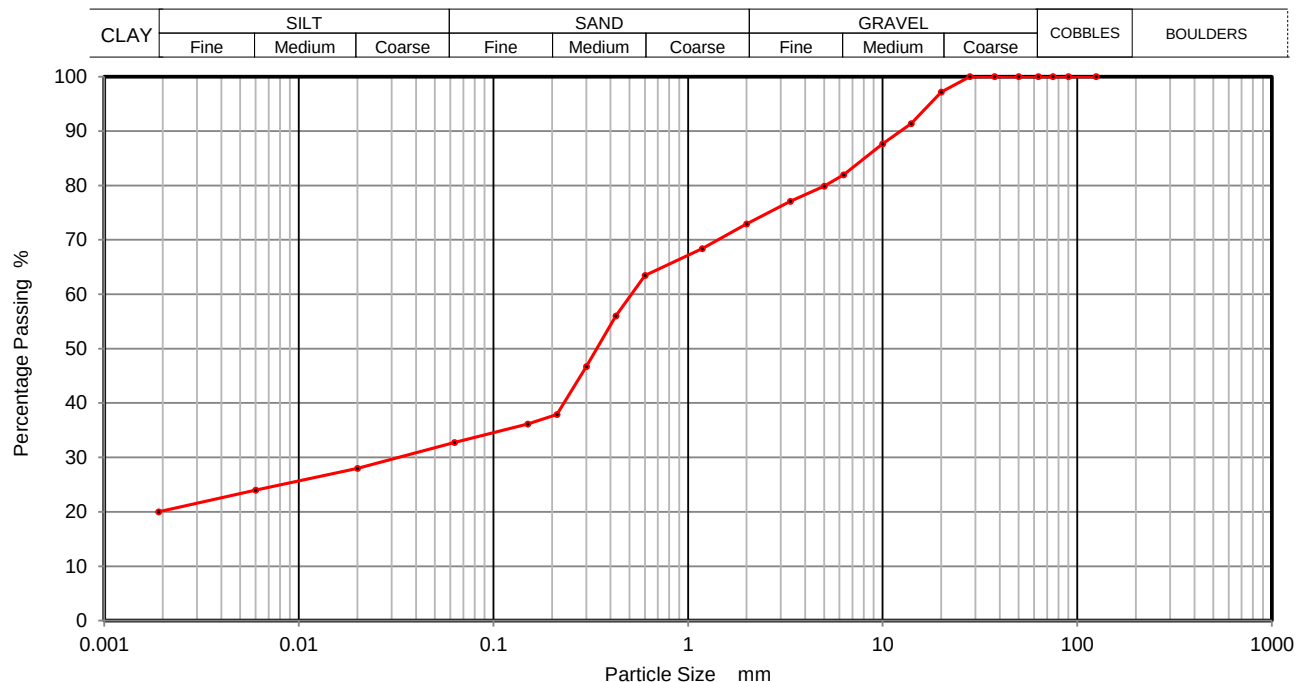
Operator	Checked	14/09/2021	Richard John	
David	Approved	15/09/2021	Paul Evans	





PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Contract Number	55495
	Borehole/Pit No. GBTP01
Site Name	Grandison Brook
Soil Description	Sample No. 7
	Depth Top 1.30
	Depth Base 1.80
Date Tested	09/09/2021
Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	28
90	100	0.0060	24
75	100	0.0020	20
63	100		
50	100		
37.5	100		
28	100		
20	97		
14	91		
10	88		
6.3	82		
5	80		
3.35	77		
2	73		
1.18	68		
0.6	63		
0.425	56		
0.3	47		
0.212	38		
0.15	36		
0.063	33		

Sample Proportions	% dry mass
Cobbles	0
Gravel	27
Sand	40
Silt	13
Clay	20

Remarks
 Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	14/09/2021	Richard John	
David	Approved	15/09/2021	Paul Evans	





Certificate of Analysis

Certificate Number 21-18799

Issued: 13-Sep-21

Client GEO Site and Testing Services Ltd
Unit 4
Heol Aur
Dafen Ind Est
Dafen
Carmarthenshire
SA14 8QN

Our Reference 21-18799

Client Reference 55495

Order No (not supplied)

Contract Title Grandison Brook

Description 6 Soil samples.

Date Received 06-Sep-21

Date Started 06-Sep-21

Date Completed 13-Sep-21

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

A handwritten signature in black ink, appearing to read "A Fenwick", is written over a light blue horizontal line.

Adam Fenwick
Contracts Manager



Summary of Chemical Analysis

Soil Samples

Our Ref 21-18799

Client Ref 55495

Contract Title Grandison Brook

Lab No	1899706	1899707	1899708	1899709	1899710	1899711
Sample ID	GBBH01	GBBH03	GBTP01	GBTP05	GBTP06	GBBH05
Depth	0.80-1.20	1.50-2.20	0.80-1.00	2.60-3.00	2.50-3.00	1.20-1.80
Other ID	5	7	5	8	8	7
Sample Type	B	B	B	B	B	B
Sampling Date	n/s	n/s	n/s	n/s	n/s	n/s
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Metals									
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	< 10	< 10	< 10			17
Inorganics									
pH	DETSC 2008#		pH	6.9	7.6	7.5			6.0
Organic matter	DETSC 2002#	0.1	%				0.3	13	
Chloride Aqueous Extract	DETSC 2055	1	mg/l	3.8	9.4	5.6			6.2
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	6.2	2.1	4.4			5.8
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	16	16	11			490
Sulphur as S, Total	DETSC 2320	0.01	%	0.02	< 0.01	0.01			0.22
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.04	0.01	0.03			0.21

Information in Support of the Analytical Results

Our Ref 21-18799
 Client Ref 55495
 Contract Grandison Brook

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1899706	GBBH01 0.80-1.20 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), Metals ICP Prep (182 days), pH + Conductivity (7 days)	
1899707	GBBH03 1.50-2.20 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), Metals ICP Prep (182 days), pH + Conductivity (7 days)	
1899708	GBTP01 0.80-1.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), Metals ICP Prep (182 days), pH + Conductivity (7 days)	
1899709	GBTP05 2.60-3.00 SOIL		PT 1L	Sample date not supplied, Organic Matter (Manual) (28 days)	
1899710	GBTP06 2.50-3.00 SOIL		PT 1L	Sample date not supplied, Organic Matter (Manual) (28 days)	
1899711	GBBH05 1.20-1.80 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), Metals ICP Prep (182 days), pH + Conductivity (7 days)	

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/- 2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report



Contract Number: 57020

Client Ref: **Q0560**

Report Date: **20-12-2021**

Client PO:

Client **Quantum Geotechnic Ltd**
Plas Newydd
Llanedi
Pontarddulais
Swansea
SA4 0FQ

Contract Title: **Grandison Brook**
For the attention of: **Arwel Jones**

Date Received: **03-12-2021**

Date Completed: **20-12-2021**

Test Description	Qty
Moisture Content of Soil BS1377 : Part 2 : Clause 3.2 : 1990 - * UKAS	8
4 Point Liquid & Plastic Limit BS 1377:1990 - Part 2 : 4.3 & 5.3 - * UKAS	6
PSD Wet & Dry Sieve method BS 1377:1990 - Part 2 : 9.2 - * UKAS	4
PSD: Sedimentation by pipette carried out with Wet Sieve (Wet Sieve must also be selected) BS 1377:1990 - Part 2 : 9.4 - * UKAS	4
Organic Matter Content-dichromate method Sub-contracted Test	3
BRE Full Suite includes pH, water & acid soluble sulphate, total sulphur, magnesium, chloride and nitrate Sub-contracted Test	2

Notes: Observations and Interpretations are outside the UKAS Accreditation

* - denotes test included in laboratory scope of accreditation

- denotes test carried out by approved contractor

@ - denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved Signatories:

Emma Sharp (Business Support Manager) - Paul Evans (Director) - Richard John (Quality/Technical Manager)

Shaun Jones (Laboratory manager) - Shaun Thomas (Site Manager) - Wayne Honey (Quality Assistant / Administrator / Health and Safety Coordinator)



Laboratory Report



GEO Site & Testing Services Ltd

Contract Number: 57020

Test Description	Qty
Samples Received	22
- @ Non Accredited Test	
Disposal of samples for job	1

Notes: Observations and Interpretations are outside the UKAS Accreditation

* - denotes test included in laboratory scope of accreditation

- denotes test carried out by approved contractor

@ - denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved Signatories:

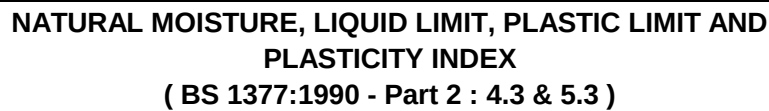
Emma Sharp (Business Support Manager) - Paul Evans (Director) - Richard John (Quality/Technical Manager)

Shaun Jones (Laboratory manager) - Shaun Thomas (Site Manager) - Wayne Honey (Quality Assistant / Administrator / Health and Safety Coordinator)

GEO Site & Testing Services Ltd

Unit 3-4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN

Tel: 01554 784040 Fax: 01554 784041 info@gstl.co.uk gstl.co.uk

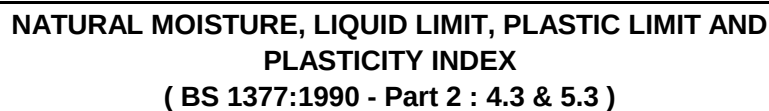


Contract Number	57020	
Site Name	Grandison Brook	
Date Tested	15/12/2021	
	DESCRIPTIONS	

[illegible]

Operators	Checked	20/12/2021	Richard John (Advanced Testing Manager)
Conor Davison	Approved	20/12/2021	Paul Evans (Quality/Technical Manager)

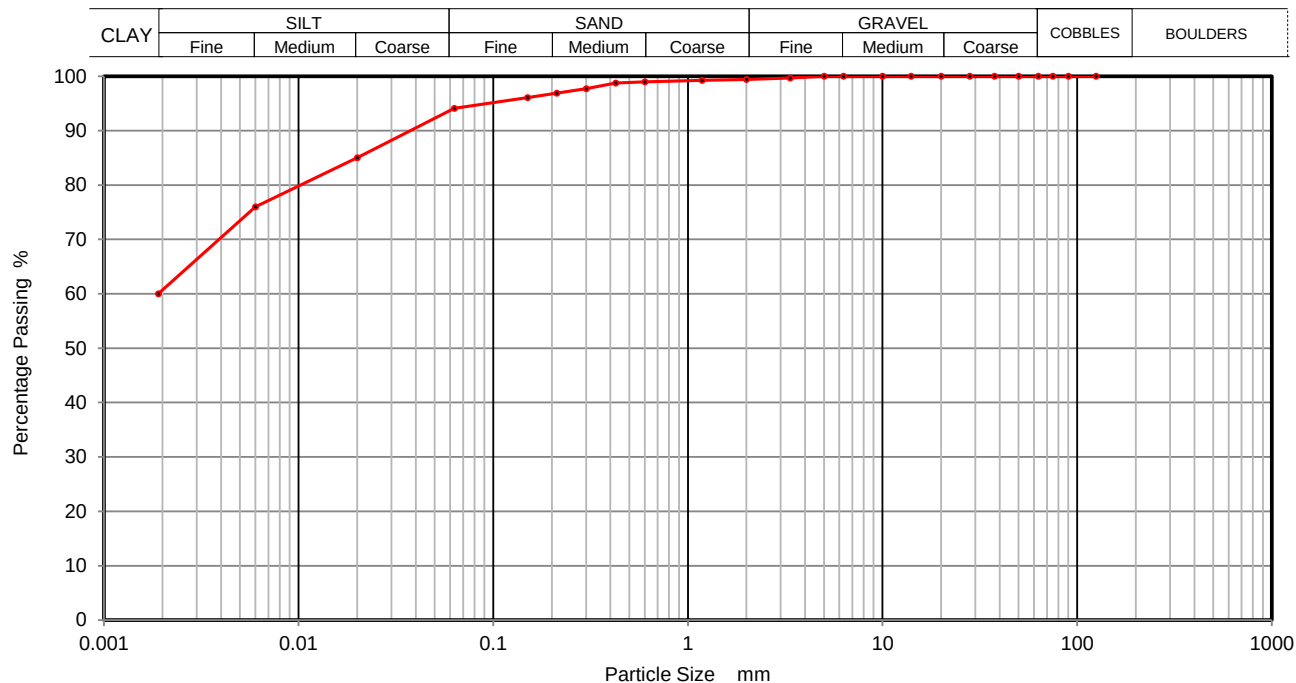






PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Contract Number	57020
	Borehole/Pit No. GBBH04
Site Name	Grandison Brook
Soil Description	Grey sandy silty CLAY.
	Depth Top 1.20
	Depth Base 1.70
Date Tested	18/12/2021
Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	85
90	100	0.0060	76
75	100	0.0020	60
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	99		
1.18	99		
0.6	99		
0.425	99		
0.3	98		
0.212	97		
0.15	96		
0.063	94		

Sample Proportions	% dry mass
Cobbles	0
Gravel	1
Sand	5
Silt	34
Clay	60

Remarks
 Preparation and testing in accordance with BS1377 unless noted below

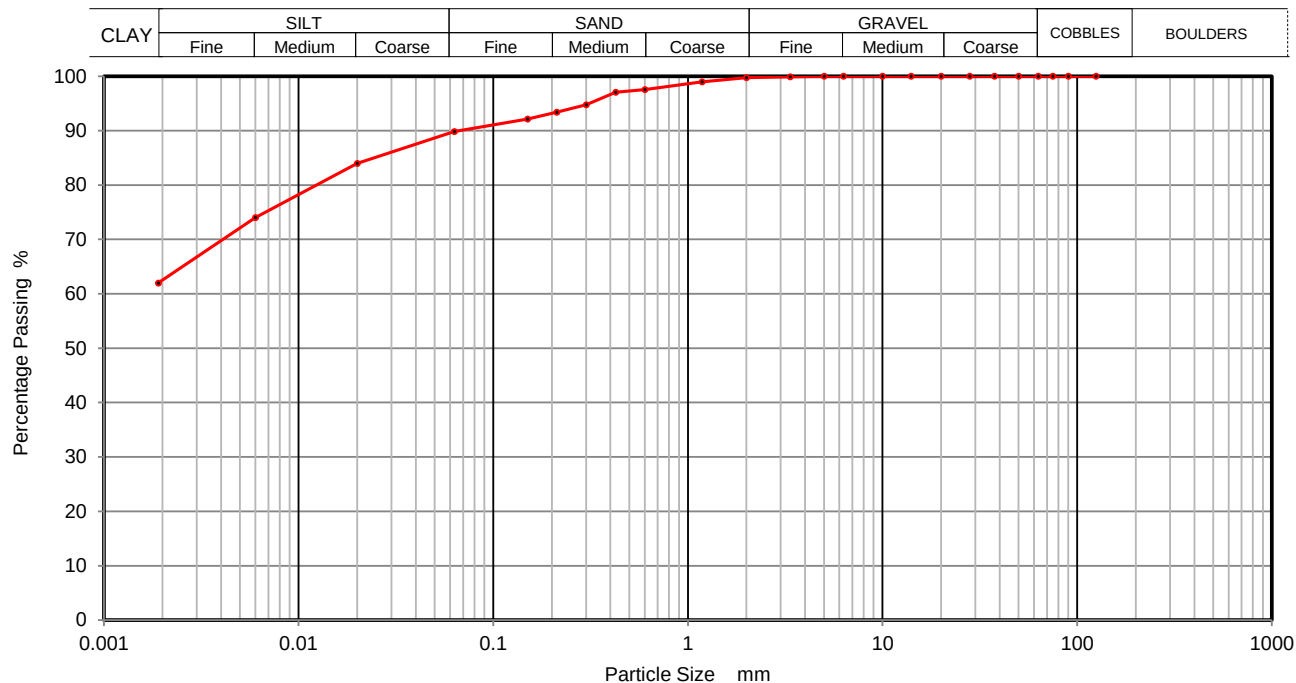
Operator	Checked	19/12/2021	Richard John	
David	Approved	20/12/2021	Paul Evans	





PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Contract Number	57020
	Borehole/Pit No. GBBH04
Site Name	Grandison Brook
Soil Description	Grey sandy silty CLAY.
	Depth Top 4.20
	Depth Base 5.00
Date Tested	18/12/2021
Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	84
90	100	0.0060	74
75	100	0.0020	62
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	98		
0.425	97		
0.3	95		
0.212	93		
0.15	92		
0.063	90		

Sample Proportions	% dry mass
Cobbles	0
Gravel	0
Sand	10
Silt	28
Clay	62

Remarks
 Preparation and testing in accordance with BS1377 unless noted below

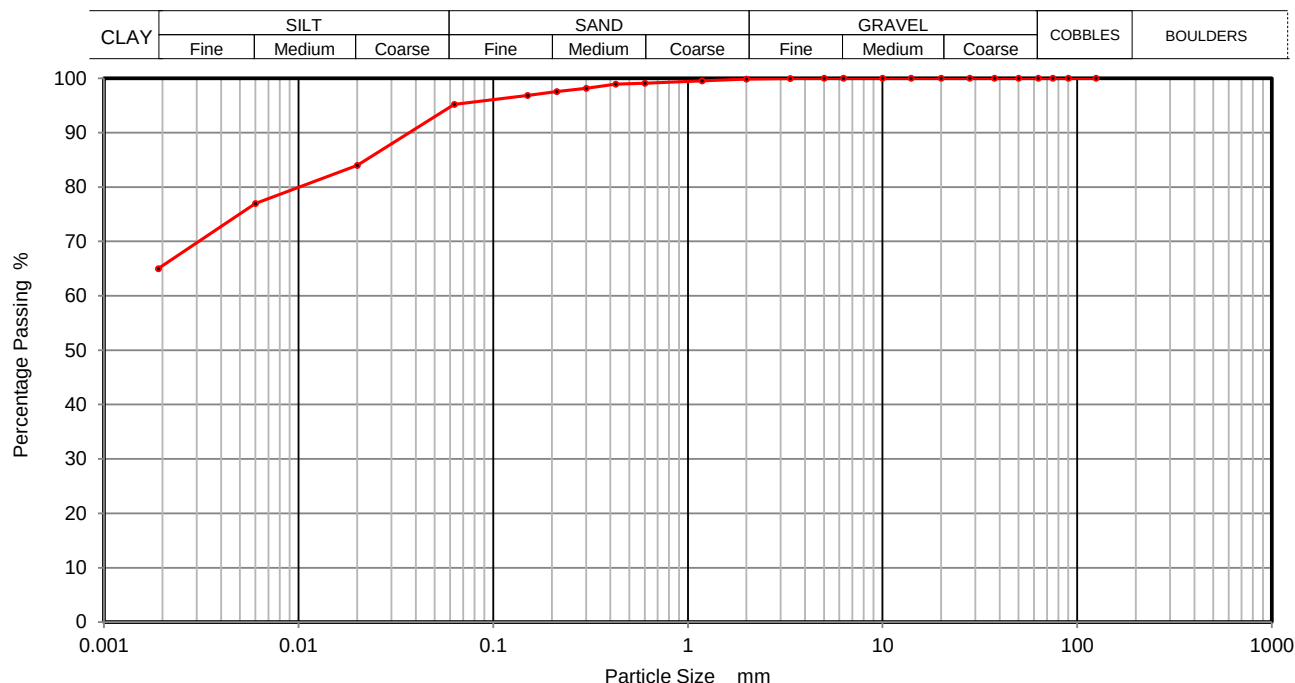
Operator	Checked	19/12/2021	Richard John	
David	Approved	20/12/2021	Paul Evans	





PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Contract Number	57020
	Borehole/Pit No. GBTP04
Site Name	Grandison Brook
Soil Description	Grey slightly sandy silty CLAY.
	Depth Top 1.00
	Depth Base 1.50
Date Tested	18/12/2021
Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	84
90	100	0.0060	77
75	100	0.0020	65
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99		
0.425	99		
0.3	98		
0.212	98		
0.15	97		
0.063	95		

Sample Proportions	% dry mass
Cobbles	0
Gravel	0
Sand	5
Silt	30
Clay	65

Remarks
 Preparation and testing in accordance with BS1377 unless noted below

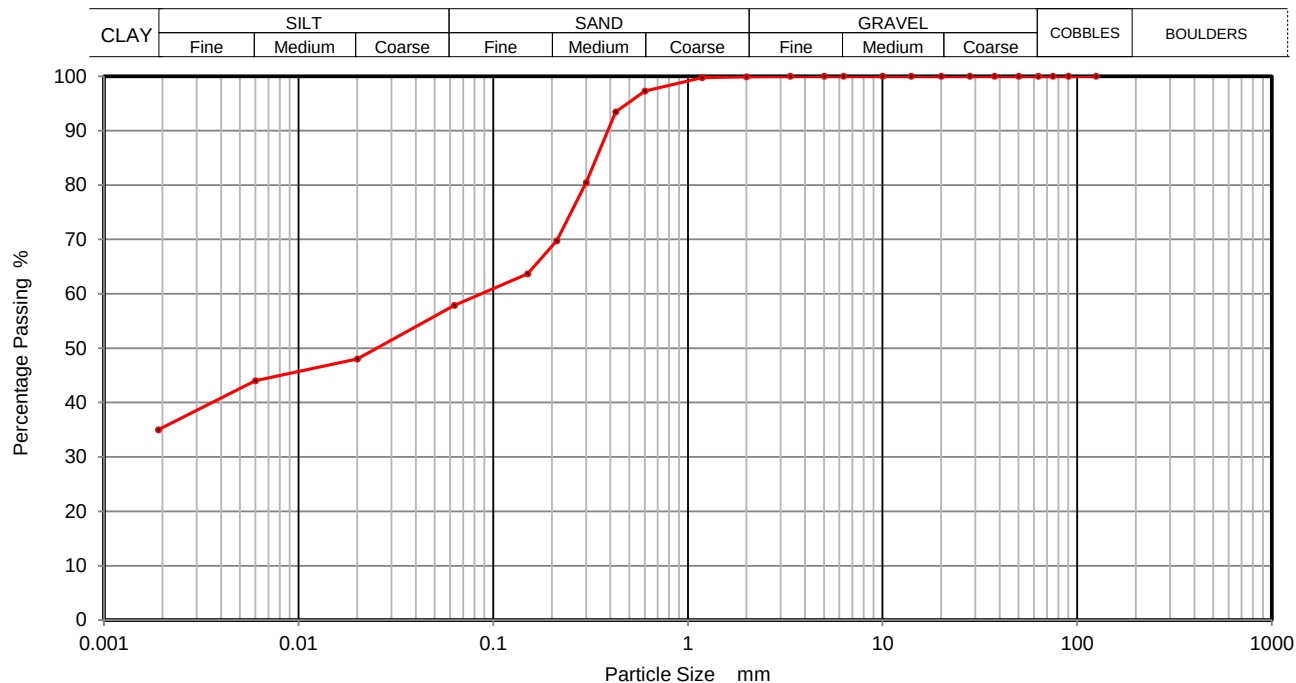
Operator	Checked	19/12/2021	Richard John	
David	Approved	20/12/2021	Paul Evans	





PARTICLE SIZE DISTRIBUTION
BS 1377 Part 2:1990
Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Contract Number	57020
	Borehole/Pit No. GBTP04
Site Name	Grandison Brook
Soil Description	Grey sandy silty CLAY.
	Depth Top 2.50
	Depth Base 3.00
Date Tested	18/12/2021
Sample Type	B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0200	48
90	100	0.0060	44
75	100	0.0020	35
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	97		
0.425	93		
0.3	81		
0.212	70		
0.15	64		
0.063	58		

Sample Proportions	% dry mass
Cobbles	0
Gravel	0
Sand	42
Silt	23
Clay	35

Remarks
 Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	19/12/2021	Richard John	
David	Approved	20/12/2021	Paul Evans	





ANALYTICAL TEST REPORT

Contract no: 103691

Contract name: Grandison Brook

Client reference: Q0560

Clients name: Geo Site & Testing Services

Clients address: Unit 3 and 4 Heol Aur
Dafen Industrial Estate, Dafen
Llanelli, Carmarthenshire
SA14 8QN

Samples received: 09 December 2021

Analysis started: 09 December 2021

Analysis completed: 20 December 2021

Report issued: 20 December 2021

Key

U	UKAS accredited test
M	MCERTS & UKAS accredited test
\$	Test carried out by an approved subcontractor
I/S	Insufficient sample to carry out test
N/S	Sample not suitable for testing

Approved by:

Rachael Burton

Reporting Team Lead

Chemtech Environmental Limited

SOILS

Lab number			103691-1	103691-2	103691-3	103691-4	103691-5
Sample id			GBTP04	GBTP04	GBBH04	GBBH04	GBBH04
Depth (m)			2.00	2.50-3.00	1.20-1.70	1.80-2.00	2.10-2.30
Sample Type			D4	B5	B5	B6	D7
Date sampled			-	-	-	-	-
Test	Method	Units					
pH	CE004 ^U	units	-	7.8	6.4	-	-
Magnesium (2:1 water soluble)	CE061	mg/l Mg	-	17	18	-	-
Chloride (2:1 water soluble)	CE049 ^U	mg/l Cl	-	15	13	-	-
Nitrate (2:1 water soluble)	CE049 ^U	mg/l NO ₃	-	<1	<1	-	-
Sulphate (2:1 water soluble)	CE061 ^U	mg/l SO ₄	-	201	176	-	-
Sulphate (total)	CE062 ^U	mg/kg SO ₄	-	706	645	-	-
Sulphur (total)	CE119	mg/kg S	-	5493	4088	-	-
Sulphur (total)	CE119	% w/w S	-	0.55	0.41	-	-
Total Organic Carbon (TOC)	CE197	% w/w C	2.3	-	-	16.2	5.6
Estimate of OMC (calculated from TOC)	CE197	% w/w	4.0	-	-	27.9	9.6

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE004	pH	Based on BS 1377, pH Meter	As received	U	-	units
CE061	Magnesium (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry		1	mg/l Mg
CE049	Chloride (2:1 water soluble)	Aqueous extraction, IC-COND	Dry	U	1	mg/l Cl
CE049	Nitrate (2:1 water soluble)	Aqueous extraction, IC-COND	Dry	U	1	mg/l NO ₃
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	U	10	mg/l SO ₄
CE062	Sulphate (total)	Acid extraction, ICP-OES	Dry	U	100	mg/kg SO ₄
CE119	Sulphur (total)	Acid extraction, ICP-OES	Dry		100	mg/kg S
CE119	Sulphur (total)	Acid extraction, ICP-OES	Dry		0.01	% w/w S
CE197	Total Organic Carbon (TOC)	Carbon Analyser	Dry		0.1	% w/w C
CE197	Estimate of OMC (calculated from TOC)	Calculation from Total Organic Carbon	Dry		0.1	% w/w

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
103691-2	GBTP04	2.50-3.00	Y	All (NSD)
103691-3	GBBH04	1.20-1.70	Y	All (NSD)

Chemtech Environmental Limited

Additional Information

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

This report shall not be reproduced except in full, without prior written approval.

Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

For soils and solids, all results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

Analytical results are inclusive of stones, where applicable.

APPENDIX VII – CHEMICAL LABORATORY TEST RESULTS



Final Report

Report No.: 21-23736-1

Initial Date of Issue: 19-Aug-2021

Client Quantum Geotechnic Ltd

Client Address: Plas Newydd
Llanedi
Pontarddulais
Swansea
SA4 0FQ

Contact(s): Arwel Jones
Phil Darby

Project Q0560 Grandison Brook

Quotation No.: Q21-25050 **Date Received:** 12-Jul-2021

Order No.: **Date Instructed:** 13-Aug-2021

No. of Samples: 7

Turnaround (Wkdays): 5 **Results Due:** 19-Aug-2021

Date Approved: 19-Aug-2021

Approved By:



Details: Glynn Harvey, Technical Manager

Results - Leachate

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:					21-23736	21-23736	21-23736	21-23736
Quotation No.: Q21-25050	Chemtest Sample ID.:					1238072	1238078	1238093	1238094
Order No.:	Client Sample Ref.:					3	5	3	6
	Sample Location:					GBBH02	GBTP05	GBTP06	GBBH05
	Sample Type:					SOIL	SOIL	SOIL	SOIL
	Top Depth (m):					0.50	1.20	1.20	1.00
	Date Sampled:					05-Jul-2021	06-Jul-2021		06-Jul-2021
Determinand	Accred.	SOP	Type	Units	LOD				
pH	U	1010	2:1		N/A	8.4	8.3	8.3	8.3
Chemical Oxygen Demand	U	1100	2:1	mg O2/l	10	10	11	14	< 10
Ammoniacal Nitrogen	U	1220	2:1	mg/l	0.050	0.86	0.093	0.12	0.17
Nitrite	U	1220	2:1	mg/l	0.020	0.023	< 0.020	< 0.020	< 0.020
Nitrate	U	1220	2:1	mg/l	0.50	2.3	2.7	1.4	5.3
Sulphate	U	1220	2:1	mg/l	1.0	23	22	33	13
Cyanide (Total)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050
Cyanide (Complex)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050
Sulphide	U	1325	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050
Magnesium	U	1455	2:1	mg/l	0.20	0.56	2.9	2.1	1.4
Aluminium (Dissolved)	N	1455	2:1	µg/l	5.0	230	38	40	44
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	1.2	1.6	3.8	3.1
Boron (Dissolved)	U	1455	2:1	µg/l	10.0	26	38	39	23
Barium (Dissolved)	U	1455	2:1	µg/l	5.00	7.4	76	99	37
Beryllium (Dissolved)	U	1455	2:1	µg/l	1.00	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium (Dissolved)	U	1455	2:1	µg/l	0.11	< 0.11	< 0.11	< 0.11	< 0.11
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	1.8	3.4	3.9	7.8
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	< 0.05	< 0.05	< 0.05	< 0.05
Manganese (Dissolved)	U	1455	2:1	µg/l	0.50	310	3.6	7.1	2.2
Molybdenum (Dissolved)	U	1455	2:1	µg/l	0.20	0.81	27	50	7.8
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	0.68	0.90	0.58	2.1
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	1.0	0.82	1.1	7.8
Antimony (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	5.9	13	13
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	0.73	2.8	4.7	0.68
Vanadium (Dissolved)	U	1455	2:1	µg/l	0.50	0.91	< 0.50	3.1	1.1
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	< 2.5	11	11	12
Chromium (Total)	N	1455	2:1	µg/l	0.50	0.51	1.8	< 0.50	< 0.50
Iron (Dissolved)	N	1455	2:1	µg/l	5.0	1600	20	23	74
Chromium (Hexavalent)	U	1490	2:1	µg/l	20	[B] < 20	[B] < 20	[A] < 20	[B] < 20
C2 Aliphatic TPH >C5-C6	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10	[B] < 0.10
C2 Aliphatic TPH >C6-C8	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10	[B] < 0.10
C2 Aliphatic TPH >C8-C10	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10	[B] < 0.10
C2 Aliphatic TPH >C10-C12	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10	[B] < 0.10
C2 Aliphatic TPH >C12-C16	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10	[B] < 0.10
C2 Aliphatic TPH >C16-C21	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10	[B] < 0.10
C2 Aliphatic TPH >C21-C35	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10	[B] < 0.10
C2 Aliphatic TPH >C35-C44	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10	[B] < 0.10
Total Aliphatic Hydrocarbons	N	1675	2:1	µg/l	5.0	[B] < 5.0	[B] < 5.0	[A] < 5.0	[B] < 5.0

Results - Leachate

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:				21-23736	21-23736	21-23736	21-23736
Quotation No.: Q21-25050	Chemtest Sample ID.:				1238072	1238078	1238093	1238094
Order No.:	Client Sample Ref.:				3	5	3	6
	Sample Location:				GBBH02	GBTP05	GBTP06	GBBH05
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.50	1.20	1.20	1.00
	Date Sampled:				05-Jul-2021	06-Jul-2021		06-Jul-2021
Determinand	Accred.	SOP	Type	Units	LOD			
C2 Aromatic TPH >C5-C7	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10
C2 Aromatic TPH >C7-C8	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10
C2 Aromatic TPH >C8-C10	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10
C2 Aromatic TPH >C10-C12	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10
C2 Aromatic TPH >C12-C16	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10
C2 Aromatic TPH >C16-C21	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10
C2 Aromatic TPH >C21-C35	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10
C2 Aromatic TPH >C35-C44	N	1675	2:1	µg/l	0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10
C2 Total Aromatic Hydrocarbons	N	1675	2:1	µg/l	5.0	[B] < 5.0	[B] < 5.0	[A] < 5.0
Total Petroleum Hydrocarbons	N	1675	2:1	µg/l	10	[B] < 10	[B] < 10	[A] < 10
Total Of 16 PAH's	N	1700	2:1	µg/l	0.20	< 0.20	< 0.20	< 0.20
Benzene	U	1760	2:1	µg/l	1.0	[B] < 1.0	[B] < 1.0	[A] < 1.0
Toluene	U	1760	2:1	µg/l	1.0	[B] < 1.0	[B] < 1.0	[A] < 1.0
Ethylbenzene	U	1760	2:1	µg/l	1.0	[B] < 1.0	[B] < 1.0	[A] < 1.0
m & p-Xylene	U	1760	2:1	µg/l	1.0	[B] < 1.0	[B] < 1.0	[A] < 1.0
o-Xylene	U	1760	2:1	µg/l	1.0	[B] < 1.0	[B] < 1.0	[A] < 1.0
Methyl Tert-Butyl Ether	N	1760	2:1	µg/l	1.0	[B] < 1.0	[B] < 1.0	[A] < 1.0
Naphthalene	N	1800	2:1	µg/l	0.010	1.3	0.98	1.1
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Coronene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Total Of 17 PAH's	N	1800	2:1	µg/l	0.20	1.3	0.98	1.1
Total Phenols	U	1920	2:1	mg/l	0.030	< 0.030	< 0.030	< 0.030

Results - Soil

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:				21-23736	21-23736	21-23736	21-23736	21-23736	21-23736	21-23736
Quotation No.: Q21-25050	Chemtest Sample ID.:				1238072	1238078	1238083	1238087	1238090	1238093	1238094
Order No.:	Client Sample Ref.:				3	5	2	3	4	3	6
	Sample Location:				GBBH02	GBTP05	GBTP01	GBTP02	GBTP03	GBTP06	GBBH05
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.50	1.20	0.30	0.60	0.60	1.20	1.00
	Date Sampled:				05-Jul-2021	06-Jul-2021	07-Jul-2021	05-Jul-2021	05-Jul-2021		06-Jul-2021
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD							
ACM Type	U	2192		N/A	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	17	22	14	15	21	22	30
Soil Colour	N	2040		N/A	Brown	Grey	Brown	Brown	Brown	Black	Black
Other Material	N	2040		N/A	Stones and Glass	Stones	Stones	Stones and Roots	Stones and Roots	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Sand	Sand	Sand	Sand	Sand	Sand
pH	M	2010		4.0	[B] 7.1	[B] 8.0	[B] 8.2	[B] 6.8	[B] 6.2	[A] 7.5	[B] 7.7
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	[B] < 0.40	[B] 0.45	[B] 0.60	[B] < 0.40	[B] < 0.40	[A] 1.1	[B] 0.63
Magnesium (Water Soluble)	M	2120	mg/kg	20	[B] < 20	[B] < 20	[B] < 20	[B] < 20	[B] < 20	[A] < 20	[B] < 20
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	[B] < 0.010	[B] < 0.010	[B] 0.063	[B] < 0.010	[B] < 0.010	[A] 0.047	[B] 0.025
Nitrite (Extractable)	N	2220	mg/kg	0.10	0.12	0.24	0.11	3.6	< 0.10	0.22	0.22
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	< 0.010	0.013	< 0.010	< 0.010	< 0.010	0.013
Cyanide (Complex)	M	2300	mg/kg	0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50	[A] < 0.50	[B] < 0.50
Cyanide (Free)	M	2300	mg/kg	0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50	[A] < 0.50	[B] < 0.50
Cyanide (Total)	M	2300	mg/kg	0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50	[A] < 0.50	[B] < 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	[B] 0.79	[B] 1.6	[B] 1.2	[B] 3.0	[B] < 0.50	[A] 23	[B] 2.1
Ammoniacal Nitrogen	M	2425	mg/kg	0.50	[B] 12	[B] 1.4	[B] 2.2	[B] 1.1	[B] 1.7	[A] 1.4	[B] 7.1
Aluminium (Total)	N	2430	mg/kg	100	[B] 5000	[B] 4400	[B] 8700	[B] 5600	[B] 3700	[A] 7800	[B] 6900
Iron (Total)	N	2430	mg/kg	100	[B] 16000	[B] 23000	[B] 20000	[B] 16000	[B] 18000	[A] 26000	[B] 26000
Sulphate (Total)	M	2430	mg/kg	100	[B] 270	[B] 1600	[B] 490	[B] 350	[B] 300	[A] 2400	[B] 2500
Arsenic	M	2450	mg/kg	1.0	2.5	23	16	7.2	3.9	38	44
Barium	M	2450	mg/kg	10	21	310	59	27	27	720	550
Beryllium	U	2450	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.6	1.4
Cadmium	M	2450	mg/kg	0.10	< 0.10	0.27	0.36	0.23	< 0.10	0.74	0.58
Chromium	M	2450	mg/kg	1.0	5.3	7.9	9.7	5.8	5.4	11	9.4
Manganese	M	2450	mg/kg	5.0	540	350	620	410	490	520	410
Molybdenum	M	2450	mg/kg	2.0	< 2.0	6.2	< 2.0	< 2.0	< 2.0	10	8.1
Antimony	N	2450	mg/kg	2.0	2.4	3.3	< 2.0	< 2.0	< 2.0	7.8	14
Copper	M	2450	mg/kg	0.50	16	77	43	20	10	220	1900
Mercury	M	2450	mg/kg	0.10	< 0.10	0.41	< 0.10	< 0.10	< 0.10	0.38	0.89
Nickel	M	2450	mg/kg	0.50	9.6	37	17	11	12	47	39
Lead	M	2450	mg/kg	0.50	8.1	220	31	14	8.6	470	1200
Selenium	M	2450	mg/kg	0.20	0.29	0.46	0.32	0.24	0.26	0.77	0.54
Vanadium	U	2450	mg/kg	5.0	< 5.0	6.8	6.7	< 5.0	< 5.0	18	13
Zinc	M	2450	mg/kg	0.50	26	230	75	46	64	450	390
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Results - Soil

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:		21-23736	21-23736	21-23736	21-23736	21-23736	21-23736	21-23736	21-23736	
Quotation No.: Q21-25050	Chemtest Sample ID.:		1238072	1238078	1238083	1238087	1238090	1238093	1238094		
Order No.:	Client Sample Ref.:		3	5	2	3	4	3	6		
	Sample Location:		GBBH02	GBTP05	GBTP01	GBTP02	GBTP03	GBTP06	GBBH05		
	Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL		
	Top Depth (m):		0.50	1.20	0.30	0.60	0.60	1.20	1.00		
	Date Sampled:		05-Jul-2021	06-Jul-2021	07-Jul-2021	05-Jul-2021	05-Jul-2021		06-Jul-2021		
	Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM		
Determinand	Accred.	SOP	Units	LOD							
Organic Matter	M	2625	%	0.40	[B] 3.8	[B] 55	[B] 3.0	[B] 3.1	[B] 6.2	[A] 60	[B] 3.0
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010	[B] < 0.010	[B] < 0.010	[B] < 0.010	[B] < 0.010	[B] < 0.010	[A] < 0.010	[B] < 0.010
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010	[B] < 0.010	[B] < 0.010	[B] < 0.010	[B] < 0.010	[B] < 0.010	[A] < 0.010	[B] < 0.010
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10	[B] < 0.10
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10	[B] < 0.10	[B] 10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10	[B] < 0.10
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10	[B] < 0.10	[B] 17	[B] < 0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10	[B] < 0.10
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10	[B] < 0.10	[B] 9.3	[B] < 0.10	[B] < 0.10	[B] 7.7	[A] < 0.10	[B] < 0.10
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10	[B] < 0.10	[B] 97	[B] < 0.10	[B] < 0.10	[B] 58	[A] 58	[B] < 0.10
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10	[B] < 0.10
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0	[B] < 1.0	[B] 130	[B] < 1.0	[B] < 1.0	[B] 66	[A] 58	[B] < 1.0
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010	[B] < 0.010	[B] < 0.010	[B] < 0.010	[B] < 0.010	[B] < 0.010	[A] < 0.010	[B] < 0.010
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010	[B] < 0.010	[B] < 0.010	[B] < 0.010	[B] < 0.010	[B] < 0.010	[A] < 0.010	[B] < 0.010
Aromatic TPH >C8-C10	N	2680	mg/kg	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10	[B] < 0.10
Aromatic TPH >C10-C12	N	2680	mg/kg	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10	[B] < 0.10
Aromatic TPH >C12-C16	N	2680	mg/kg	0.10	[B] < 0.10	[B] 6.5	[B] < 0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10	[B] < 0.10
Aromatic TPH >C16-C21	N	2680	mg/kg	0.10	[B] < 0.10	[B] 47	[B] < 0.10	[B] < 0.10	[B] < 0.10	[A] 39	[B] 11
Aromatic TPH >C21-C35	N	2680	mg/kg	0.10	[B] < 0.10	[B] 280	[B] < 0.10	[B] < 0.10	[B] 81	[A] 260	[B] 120
Aromatic TPH >C35-C44	N	2680	mg/kg	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[A] < 0.10	[B] < 0.10
Total Aromatic Hydrocarbons	N	2680	mg/kg	1.0	[B] < 1.0	[B] 340	[B] < 1.0	[B] < 1.0	[B] 81	[A] 300	[B] 130
Total Petroleum Hydrocarbons	N	2680	mg/kg	2.0	[B] < 2.0	[B] 470	[B] < 2.0	[B] < 2.0	[B] 150	[A] 360	[B] 130
Benzene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[A] < 1.0	[B] < 1.0
Toluene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[A] < 1.0	[B] < 1.0
Ethylbenzene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[A] < 1.0	[B] < 1.0
m & p-Xylene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[A] < 1.0	[B] < 1.0
o-Xylene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[A] < 1.0	[B] < 1.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[A] < 1.0	[B] < 1.0
Naphthalene	N	2800	mg/kg	0.010	[B] 0.11	[B] 0.88	[B] < 0.010	[B] < 0.010	[B] < 0.010	[A] 1.0	[B] 1.5
Acenaphthylene	N	2800	mg/kg	0.010	[B] 0.025	[B] 0.16	[B] < 0.010	[B] < 0.010	[B] < 0.010	[A] 0.42	[B] 0.25
Acenaphthene	N	2800	mg/kg	0.010	[B] 0.024	[B] 0.17	[B] < 0.010	[B] < 0.010	[B] < 0.010	[A] 0.55	[B] 0.23
Fluorene	N	2800	mg/kg	0.010	[B] 0.065	[B] 0.26	[B] < 0.010	[B] < 0.010	[B] < 0.010	[A] 0.57	[B] 0.31
Phenanthrene	N	2800	mg/kg	0.010	[B] 0.18	[B] 2.0	[B] 0.26	[B] 0.19	[B] 0.16	[A] 5.7	[B] 3.7
Anthracene	N	2800	mg/kg	0.010	[B] 0.073	[B] 0.27	[B] 0.055	[B] 0.022	[B] 0.052	[A] 1.2	[B] 0.69
Fluoranthene	N	2800	mg/kg	0.010	[B] 0.076	[B] 2.0	[B] 0.26	[B] 0.12	[B] 0.082	[A] 13	[B] 5.9
Pyrene	N	2800	mg/kg	0.010	[B] 0.053	[B] 1.7	[B] 0.22	[B] 0.081	[B] 0.074	[A] 10	[B] 5.0
Benzo[a]anthracene	N	2800	mg/kg	0.010	[B] 0.070	[B] 1.5	[B] 0.14	[B] 0.065	[B] 0.068	[A] 8.0	[B] 3.9
Chrysene	N	2800	mg/kg	0.010	[B] 0.082	[B] 2.1	[B] 0.17	[B] 0.087	[B] 0.078	[A] 9.2	[B] 4.1
Benzo[b]fluoranthene	N	2800	mg/kg	0.010	[B] 0.048	[B] 2.1	[B] 0.23	[B] 0.090	[B] 0.056	[A] 12	[B] 6.0
Benzo[k]fluoranthene	N	2800	mg/kg	0.010	[B] 0.060	[B] 0.87	[B] 0.079	[B] 0.024	[B] 0.030	[A] 4.4	[B] 2.4

Results - Soil

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:		21-23736	21-23736	21-23736	21-23736	21-23736	21-23736	21-23736	21-23736	
Quotation No.: Q21-25050	Chemtest Sample ID.:		1238072	1238078	1238083	1238087	1238090	1238093	1238094		
Order No.:	Client Sample Ref.:		3	5	2	3	4	3	6		
	Sample Location:		GBBH02	GBTP05	GBTP01	GBTP02	GBTP03	GBTP06	GBBH05		
	Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL		
	Top Depth (m):		0.50	1.20	0.30	0.60	0.60	1.20	1.00		
	Date Sampled:		05-Jul-2021	06-Jul-2021	07-Jul-2021	05-Jul-2021	05-Jul-2021		06-Jul-2021		
	Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM		
Determinand	Accred.	SOP	Units	LOD							
Benzo[a]pyrene	N	2800	mg/kg	0.010	[B] 0.064	[B] 1.6	[B] 0.12	[B] 0.033	[B] 0.018	[A] 8.4	[B] 4.3
Indeno(1,2,3-c,d)Pyrene	N	2800	mg/kg	0.010	[B] 0.049	[B] 1.2	[B] 0.15	[B] 0.014	[B] < 0.010	[A] 7.3	[B] 3.7
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.010	[B] 0.11	[B] 0.35	[B] 0.084	[B] 0.038	[B] < 0.010	[A] 1.6	[B] 0.92
Benzo[g,h,i]perylene	N	2800	mg/kg	0.010	[B] 0.11	[B] 1.1	[B] 0.20	[B] 0.075	[B] < 0.010	[A] 5.9	[B] 3.7
Coronene	N	2800	mg/kg	0.010	[B] < 0.010	[B] < 0.010	[B] < 0.010	[B] < 0.010	[B] < 0.010	[A] < 0.010	[B] < 0.010
Total Of 17 PAH's	N	2800	mg/kg	0.20	[B] 1.2	[B] 18	[B] 2.0	[B] 0.84	[B] 0.62	[A] 89	[B] 47
Total Phenols	M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - 2 Stage WAC

Project: Q0560 Grandison Brook

Chemtest Job No: 21-23736							Landfill Waste Acceptance Criteria				
Chemtest Sample ID: 1238094							Limits				
Sample Ref: 6							Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill		
Sample ID:											
Sample Location: GBBH05											
Top Depth(m): 1.00											
Bottom Depth(m):											
Sampling Date: 06-Jul-2021											
Determinand	SOP	Accred.	Units								
Total Organic Carbon	2625	M	%					[B] 1.7	3	5	6
Loss on Ignition									--	--	10
Total BTEX	2760	M	mg/kg					[B] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg					< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg					[B] 13	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg					59	100	--	--
pH									--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg		0.0030	--	To evaluate	To evaluate			
Eluate Analysis			2:1 mg/l	8:1 mg/l	2:1 mg/kg	Cumulative mg/kg 10:1	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg				
Arsenic	1455	U	0.0031	0.0039	0.0058	0.038	0.5	2	25		
Barium	1455	U	0.037	0.013	0.069	0.14	20	100	300		
Cadmium	1455	U	< 0.00011	< 0.00011	< 0.00011	< 0.00011	0.04	1	5		
Chromium	1455	U	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.5	10	70		
Copper	1455	U	0.0078	0.012	0.015	0.0019	2	50	100		
Mercury	1455	U	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.01	0.2	2		
Molybdenum	1455	U	0.0078	0.0018	0.015	0.019	0.5	10	30		
Nickel	1455	U	0.0021	0.0023	0.0039	0.023	0.4	10	40		
Lead	1455	U	0.0078	0.023	0.015	0.22	0.5	10	50		
Antimony	1455	U	0.013	0.0041	0.025	0.043	0.06	0.7	5		
Selenium	1455	U	0.0007	< 0.0005	0.0013	< 0.0005	0.1	0.5	7		
Zinc	1455	U	0.012	0.009	0.023	0.088	4	50	200		
Chloride	1220	U	1.3	< 1.0	< 10	< 10	800	15000	25000		
Fluoride	1220	U	0.22	0.19	< 1.0	1.9	10	150	500		
Sulphate	1220	U	13	1.1	24	14	1000	20000	50000		
Total Dissolved Solids	1020	N	5.4	28	10	270	4000	60000	100000		
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-		
Dissolved Organic Carbon	1610	U	8.3	< 2.5	< 50	< 50	500	800	1000		

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	30

Leachate Test Information	
Leachant volume 1st extract/l	0.276
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.043

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request. The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1238072	3		GBBH02	05-Jul-2021	B	Amber Glass 250ml
1238072	3		GBBH02	05-Jul-2021	B	Amber Glass 60ml
1238072	3		GBBH02	05-Jul-2021	B	Plastic Tub 500g
1238078	5		GBTP05	06-Jul-2021	B	Amber Glass 250ml
1238078	5		GBTP05	06-Jul-2021	B	Amber Glass 60ml
1238078	5		GBTP05	06-Jul-2021	B	Plastic Tub 500g
1238083	2		GBTP01	07-Jul-2021	B	Amber Glass 250ml
1238083	2		GBTP01	07-Jul-2021	B	Plastic Tub 500g
1238087	3		GBTP02	05-Jul-2021	B	Amber Glass 250ml
1238087	3		GBTP02	05-Jul-2021	B	Amber Glass 60ml
1238087	3		GBTP02	05-Jul-2021	B	Plastic Tub 500g
1238090	4		GBTP03	05-Jul-2021	B	Amber Glass 250ml
1238090	4		GBTP03	05-Jul-2021	B	Amber Glass 60ml
1238090	4		GBTP03	05-Jul-2021	B	Plastic Tub 500g
1238093	3		GBTP06		A	Amber Glass 250ml
1238093	3		GBTP06		A	Plastic Tub 500g
1238094	6		GBBH05	06-Jul-2021	B	Amber Glass 250ml
1238094	6		GBBH05	06-Jul-2021	B	Amber Glass 60ml
1238094	6		GBBH05	06-Jul-2021	B	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1100	Chemical Oxygen Demand	Chemical Oxygen demand (COD)	Dichromate oxidation of organic matter in sample followed by colorimetric determination of residual Cr[VI].
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1325	Sulphide in Waters	Sulphides	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using N,N-dimethyl-pphenylenediamine.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazine.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930

Test Methods

SOP	Title	Parameters included	Method summary
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurement by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
2300	Cyanides & Thiocyanate in Soils	Free (or easily liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N-dimethyl-p-phenylenediamine.
2425	Extractable Ammonium in soils	Ammonium	Extraction with potassium chloride solution / analysis by 'Aquakem 600' Discrete Analyser using sodium salicylate and sodium dichloroisocyanurate.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8, >C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35–C44 Aromatics: >C5–C7, >C7–C8, >C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35–C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenzo[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS

Test Methods

SOP	Title	Parameters included	Method summary
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge
650	Characterisation of Waste (Leaching WAC)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com



Final Report

Report No.:	21-27605-1		
Initial Date of Issue:	19-Aug-2021		
Client	Quantum Geotechnic Ltd		
Client Address:	13A Bishops Court Gardens Clyst St Mary Exeter EX5 1DH		
Contact(s):	Ross McDermott		
Project	Q0560 Grandison Brook		
Quotation No.:	Q21-25050	Date Received:	11-Aug-2021
Order No.:		Date Instructed:	13-Aug-2021
No. of Samples:	2		
Turnaround (Wkdays):	5	Results Due:	19-Aug-2021
Date Approved:	19-Aug-2021		
Approved By:			
Details:	Glynn Harvey, Technical Manager		

Results - Leachate

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:					21-27605	21-27605
Quotation No.: Q21-25050	Chemtest Sample ID.:					1257574	1257577
	Client Sample ID.:					ES3	ES3
	Sample Location:					GBH01	GBH03
	Sample Type:					SOIL	SOIL
	Top Depth (m):					0.5	0.5
Determinand	Accred.	SOP	Type	Units	LOD		
pH	U	1010	2:1		N/A	8.7	8.5
Chemical Oxygen Demand	U	1100	2:1	mg O2/l	10	11	13
Ammoniacal Nitrogen	U	1220	2:1	mg/l	0.050	0.093	0.093
Nitrite	U	1220	2:1	mg/l	0.020	0.038	0.020
Nitrate	U	1220	2:1	mg/l	0.50	1.2	< 0.50
Sulphate	U	1220	2:1	mg/l	1.0	7.0	32
Cyanide (Total)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050
Cyanide (Complex)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050
Sulphide	U	1325	2:1	mg/l	0.050	< 0.050	< 0.050
Magnesium	U	1455	2:1	mg/l	0.20	0.75	1.4
Aluminium (Dissolved)	N	1455	2:1	µg/l	5.0	210	18
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	1.0	16
Boron (Dissolved)	U	1455	2:1	µg/l	10.0	16	66
Barium (Dissolved)	U	1455	2:1	µg/l	5.00	< 5.0	14
Beryllium (Dissolved)	U	1455	2:1	µg/l	1.00	< 1.0	< 1.0
Cadmium (Dissolved)	U	1455	2:1	µg/l	0.11	< 0.11	< 0.11
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	1.8	2.4
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	< 0.05	0.08
Manganese (Dissolved)	U	1455	2:1	µg/l	0.50	20	1.9
Molybdenum (Dissolved)	U	1455	2:1	µg/l	0.20	1.1	46
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	0.76	< 0.50
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	0.52	< 0.50
Antimony (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	1.3
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	2.4	6.6
Vanadium (Dissolved)	U	1455	2:1	µg/l	0.50	0.93	19
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	6.5	< 2.5
Chromium (Total)	N	1455	2:1	µg/l	0.50	0.76	4.8
Iron (Dissolved)	N	1455	2:1	µg/l	5.0	1700	7.9
Chromium (Hexavalent)	U	1490	2:1	µg/l	20	[A] < 20	[A] < 20
C2 Aliphatic TPH >C5-C6	N	1675	2:1	µg/l	0.10	[A] < 0.10	[A] < 0.10
C2 Aliphatic TPH >C6-C8	N	1675	2:1	µg/l	0.10	[A] < 0.10	[A] < 0.10
C2 Aliphatic TPH >C8-C10	N	1675	2:1	µg/l	0.10	[A] < 0.10	[A] < 0.10
C2 Aliphatic TPH >C10-C12	N	1675	2:1	µg/l	0.10	[A] < 0.10	[A] < 0.10
C2 Aliphatic TPH >C12-C16	N	1675	2:1	µg/l	0.10	[A] < 0.10	[A] < 0.10
C2 Aliphatic TPH >C16-C21	N	1675	2:1	µg/l	0.10	[A] < 0.10	[A] < 0.10
C2 Aliphatic TPH >C21-C35	N	1675	2:1	µg/l	0.10	[A] < 0.10	[A] < 0.10
C2 Aliphatic TPH >C35-C44	N	1675	2:1	µg/l	0.10	[A] < 0.10	[A] < 0.10
Total Aliphatic Hydrocarbons	N	1675	2:1	µg/l	5.0	[A] < 5.0	[A] < 5.0
C2 Aromatic TPH >C5-C7	N	1675	2:1	µg/l	0.10	[A] < 0.10	[A] < 0.10

Results - Leachate

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.: 21-27605						21-27605
Quotation No.: Q21-25050	Chemtest Sample ID.: 1257574						1257577
	Client Sample ID.:						ES3
	Sample Location:						GBH01
	Sample Type:						SOIL
	Top Depth (m):						0.5
Determinand	Accred.	SOP	Type	Units	LOD		
C2 Aromatic TPH >C7-C8	N	1675	2:1	µg/l	0.10	[A] < 0.10	[A] < 0.10
C2 Aromatic TPH >C8-C10	N	1675	2:1	µg/l	0.10	[A] < 0.10	[A] < 0.10
C2 Aromatic TPH >C10-C12	N	1675	2:1	µg/l	0.10	[A] < 0.10	[A] < 0.10
C2 Aromatic TPH >C12-C16	N	1675	2:1	µg/l	0.10	[A] < 0.10	[A] < 0.10
C2 Aromatic TPH >C16-C21	N	1675	2:1	µg/l	0.10	[A] < 0.10	[A] < 0.10
C2 Aromatic TPH >C21-C35	N	1675	2:1	µg/l	0.10	[A] < 0.10	[A] < 0.10
C2 Aromatic TPH >C35-C44	N	1675	2:1	µg/l	0.10	[A] < 0.10	[A] < 0.10
C2 Total Aromatic Hydrocarbons	N	1675	2:1	µg/l	5.0	[A] < 5.0	[A] < 5.0
Total Petroleum Hydrocarbons	N	1675	2:1	µg/l	10	[A] < 10	[A] < 10
Total Of 16 PAH's	N	1700	2:1	µg/l	0.20	38	< 0.20
Benzene	U	1760	2:1	µg/l	1.0	[A] < 1.0	[A] < 1.0
Toluene	U	1760	2:1	µg/l	1.0	[A] < 1.0	[A] < 1.0
Ethylbenzene	U	1760	2:1	µg/l	1.0	[A] < 1.0	[A] < 1.0
m & p-Xylene	U	1760	2:1	µg/l	1.0	[A] < 1.0	[A] < 1.0
o-Xylene	U	1760	2:1	µg/l	1.0	[A] < 1.0	[A] < 1.0
Methyl Tert-Butyl Ether	N	1760	2:1	µg/l	1.0	[A] < 1.0	[A] < 1.0
Naphthalene	N	1800	2:1	µg/l	0.010	1.3	1.3
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Coronene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Total Of 17 PAH's	N	1800	2:1	µg/l	0.20	1.3	1.3
Total Phenols	U	1920	2:1	mg/l	0.030	< 0.030	< 0.030

Results - Soil

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:				21-27605	21-27605
Quotation No.: Q21-25050	Chemtest Sample ID.:				1257574	1257577
	Client Sample ID.:				ES3	ES3
	Sample Location:				GBH01	GBH03
	Sample Type:				SOIL	SOIL
	Top Depth (m):				0.5	0.5
	Asbestos Lab:				DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD		
ACM Type	U	2192		N/A	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	13	9.4
Soil Colour	N	2040		N/A	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Sand
pH	M	2010		4.0	[A] 7.2	[A] 8.3
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	[A] < 0.40	[A] 0.53
Magnesium (Water Soluble)	M	2120	mg/kg	20	[A] < 20	[A] < 20
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	[A] < 0.010	[A] 0.021
Nitrite (Extractable)	N	2220	mg/kg	0.10	< 0.10	0.12
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	< 0.010
Cyanide (Complex)	M	2300	mg/kg	0.50	[A] < 0.50	[A] < 0.50
Cyanide (Free)	M	2300	mg/kg	0.50	[A] < 0.50	[A] < 0.50
Cyanide (Total)	M	2300	mg/kg	0.50	[A] < 0.50	[A] < 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	[A] 13	[A] 1.5
Ammoniacal Nitrogen	M	2425	mg/kg	0.50	[A] 3.3	[A] 3.3
Aluminium (Total)	N	2430	mg/kg	100	[A] 12000	[A] 11000
Iron (Total)	N	2430	mg/kg	100	[A] 21000	[A] 20000
Sulphate (Total)	M	2430	mg/kg	100	[A] 150	[A] 170
Arsenic	M	2450	mg/kg	1.0	14	13
Barium	M	2450	mg/kg	10	55	48
Beryllium	U	2450	mg/kg	1.0	< 1.0	< 1.0
Cadmium	M	2450	mg/kg	0.10	0.16	0.16
Chromium	M	2450	mg/kg	1.0	12	12
Manganese	M	2450	mg/kg	5.0	710	640
Molybdenum	M	2450	mg/kg	2.0	< 2.0	< 2.0
Antimony	N	2450	mg/kg	2.0	2.0	< 2.0
Copper	M	2450	mg/kg	0.50	22	20
Mercury	M	2450	mg/kg	0.10	< 0.10	< 0.10
Nickel	M	2450	mg/kg	0.50	38	36
Lead	M	2450	mg/kg	0.50	56	52
Selenium	M	2450	mg/kg	0.20	< 0.20	< 0.20
Vanadium	U	2450	mg/kg	5.0	8.8	7.9
Zinc	M	2450	mg/kg	0.50	77	63
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	[A] 1.7	[A] 13
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010	[A] < 0.010	[A] < 0.010

Results - Soil

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:				21-27605	21-27605
Quotation No.: Q21-25050	Chemtest Sample ID.:				1257574	1257577
	Client Sample ID.:				ES3	ES3
	Sample Location:				GBH01	GBH03
	Sample Type:				SOIL	SOIL
	Top Depth (m):				0.5	0.5
	Asbestos Lab:				DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD		
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010	[A] < 0.010	[A] < 0.010
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10	[A] < 0.10	[A] < 0.10
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10	[A] < 0.10	[A] < 0.10
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10	[A] < 0.10	[A] 14
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10	[A] < 0.10	[A] 34
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10	[A] 36	[A] 110
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10	[A] < 0.10	[A] 160
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0	[A] 36	[A] 310
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010	[A] < 0.010	[A] < 0.010
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010	[A] < 0.010	[A] < 0.010
Aromatic TPH >C8-C10	N	2680	mg/kg	0.10	[A] < 0.10	[A] < 0.10
Aromatic TPH >C10-C12	N	2680	mg/kg	0.10	[A] < 0.10	[A] 4.5
Aromatic TPH >C12-C16	N	2680	mg/kg	0.10	[A] < 0.10	[A] 250
Aromatic TPH >C16-C21	N	2680	mg/kg	0.10	[A] 17	[A] 1500
Aromatic TPH >C21-C35	N	2680	mg/kg	0.10	[A] 160	[A] 4900
Aromatic TPH >C35-C44	N	2680	mg/kg	0.10	[A] < 0.10	[A] 350
Total Aromatic Hydrocarbons	N	2680	mg/kg	1.0	[A] 180	[A] 7000
Total Petroleum Hydrocarbons	N	2680	mg/kg	2.0	[A] 210	[A] 7300
Benzene	M	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0
Toluene	M	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0
Ethylbenzene	M	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0
m & p-Xylene	M	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0
o-Xylene	M	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	[A] < 1.0	[A] < 1.0
Naphthalene	N	2800	mg/kg	0.010	[A] < 0.010	[A] 0.81
Acenaphthylene	N	2800	mg/kg	0.010	[A] < 0.010	[A] 2.1
Acenaphthene	N	2800	mg/kg	0.010	[A] < 0.010	[A] 1.0
Fluorene	N	2800	mg/kg	0.010	[A] < 0.010	[A] 1.5
Phenanthrene	N	2800	mg/kg	0.010	[A] 0.063	[A] 16
Anthracene	N	2800	mg/kg	0.010	[A] 0.017	[A] 6.6
Fluoranthene	N	2800	mg/kg	0.010	[A] 0.11	[A] 61
Pyrene	N	2800	mg/kg	0.010	[A] 0.089	[A] 47
Benzo[a]anthracene	N	2800	mg/kg	0.010	[A] 0.091	[A] 37
Chrysene	N	2800	mg/kg	0.010	[A] 0.060	[A] 36
Benzo[b]fluoranthene	N	2800	mg/kg	0.010	[A] 0.12	[A] 50
Benzo[k]fluoranthene	N	2800	mg/kg	0.010	[A] 0.056	[A] 20
Benzo[a]pyrene	N	2800	mg/kg	0.010	[A] 0.063	[A] 37
Indeno(1,2,3-c,d)Pyrene	N	2800	mg/kg	0.010	[A] 0.045	[A] 30
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.010	[A] 0.025	[A] 6.2

Results - Soil

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:				21-27605	21-27605
Quotation No.: Q21-25050	Chemtest Sample ID.:				1257574	1257577
	Client Sample ID.:				ES3	ES3
	Sample Location:				GBH01	GBH03
	Sample Type:				SOIL	SOIL
	Top Depth (m):				0.5	0.5
	Asbestos Lab:				DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD		
Benzo[g,h,i]perylene	N	2800	mg/kg	0.010	[A] 0.041	[A] 25
Coronene	N	2800	mg/kg	0.010	[A] < 0.010	[A] < 0.010
Total Of 17 PAH's	N	2800	mg/kg	0.20	[A] 0.78	[A] 380
Total Phenols	M	2920	mg/kg	0.10	< 0.10	< 0.10

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request. The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1257574		ES3	GBH01		A	Amber Glass 250ml
1257574		ES3	GBH01		A	Amber Glass 60ml
1257574		ES3	GBH01		A	Plastic Tub 500g
1257577		ES3	GBH03		A	Amber Glass 250ml
1257577		ES3	GBH03		A	Amber Glass 60ml
1257577		ES3	GBH03		A	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1100	Chemical Oxygen Demand	Chemical Oxygen demand (COD)	Dichromate oxidation of organic matter in sample followed by colorimetric determination of residual Cr[VI].
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1325	Sulphide in Waters	Sulphides	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using N,N-dimethyl-pphenylenediamine.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazine.
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurement by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.

Test Methods

SOP	Title	Parameters included	Method summary
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N-dimethyl-p-phenylenediamine.
2425	Extractable Ammonium in soils	Ammonium	Extraction with potassium chloride solution / analysis by 'Aquakem 600' Discrete Analyser using sodium salicylate and sodium dichloroisocyanurate.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44 Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenzo[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and Trimethylphenols Note: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	Compliance Test for Leaching of Granular Waste Material and Sludge
650	Characterisation of Waste (Leaching WAC)	Waste material including soil, sludges and granular waste	Compliance Test for Leaching of Granular Waste Material and Sludge

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com



Final Report

Report No.: 21-29503-1

Initial Date of Issue: 31-Aug-2021

Client Quantum Geotechnic Ltd

Client Address: Plas Newydd
Llanedi
Pontarddulais
Swansea
SA4 0FQ

Contact(s): Arwel Jones
Phil Darby

Project Q0560 Grandison Brook

Quotation No.: Q21-25050 **Date Received:** 24-Aug-2021

Order No.: **Date Instructed:** 24-Aug-2021

No. of Samples: 3

Turnaround (Wkdays): 5 **Results Due:** 31-Aug-2021

Date Approved: 31-Aug-2021

Approved By:


Details: Glynn Harvey, Technical Manager

Results - Leachate

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:					21-29503	21-29503	21-29503
Quotation No.: Q21-25050	Chemtest Sample ID.:					1266784	1266785	1266786
	Sample Location:					HP02	HP02	HP03
	Sample Type:					SOIL	SOIL	SOIL
	Top Depth (m):					0.50	1.00	0.40
	Date Sampled:					18-Aug-2021	18-Aug-2021	19-Aug-2021
Determinand	Accred.	SOP	Type	Units	LOD			
pH	U	1010	2:1		N/A	8.3	8.0	8.1
Chemical Oxygen Demand	U	1100	2:1	mg O2/l	10	31	25	< 10
Ammoniacal Nitrogen	U	1220	2:1	mg/l	0.050	0.068	0.061	0.078
Nitrite	U	1220	2:1	mg/l	0.020	< 0.020	< 0.020	< 0.020
Nitrate	U	1220	2:1	mg/l	0.50	< 0.50	1.2	1.3
Sulphate	U	1220	2:1	mg/l	1.0	35	12	11
Cyanide (Total)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050
Cyanide (Complex)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050
Sulphide	U	1325	2:1	mg/l	0.050	< 0.050	< 0.050	< 0.050
Magnesium	U	1455	2:1	mg/l	0.20	2.8	3.4	2.5
Aluminium (Dissolved)	N	1455	2:1	µg/l	5.0	37	8.7	39
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	11	1.0	2.6
Boron (Dissolved)	U	1455	2:1	µg/l	10.0	61	26	20
Barium (Dissolved)	U	1455	2:1	µg/l	5.00	37	10	44
Beryllium (Dissolved)	U	1455	2:1	µg/l	1.00	< 1.0	< 1.0	< 1.0
Cadmium (Dissolved)	U	1455	2:1	µg/l	0.11	< 0.11	< 0.11	< 0.11
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	3.8	2.0	1.6
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	< 0.05	< 0.05	< 0.05
Manganese (Dissolved)	U	1455	2:1	µg/l	0.50	16	1.7	0.96
Molybdenum (Dissolved)	U	1455	2:1	µg/l	0.20	20	6.6	10
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	0.67	< 0.50	< 0.50
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	< 0.50	< 0.50	< 0.50
Antimony (Dissolved)	U	1455	2:1	µg/l	0.50	1.4	< 0.50	4.4
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	5.3	1.2	0.59
Vanadium (Dissolved)	U	1455	2:1	µg/l	0.50	9.3	< 0.50	0.79
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	< 2.5	< 2.5	< 2.5
Chromium (Total)	N	1455	2:1	µg/l	0.50	0.58	< 0.50	1.5
Iron (Dissolved)	N	1455	2:1	µg/l	5.0	18	6.7	< 5.0
Chromium (Hexavalent)	U	1490	2:1	µg/l	20	< 20	< 20	< 20
C2 Aliphatic TPH >C5-C6	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10	< 0.10
C2 Aliphatic TPH >C6-C8	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10	< 0.10
C2 Aliphatic TPH >C8-C10	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10	< 0.10
C2 Aliphatic TPH >C10-C12	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10	< 0.10
C2 Aliphatic TPH >C12-C16	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10	< 0.10
C2 Aliphatic TPH >C16-C21	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10	< 0.10
C2 Aliphatic TPH >C21-C35	N	1675	2:1	µg/l	0.10	87	100	120
C2 Aliphatic TPH >C35-C44	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	2:1	µg/l	5.0	87	100	120
C2 Aromatic TPH >C5-C7	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10	< 0.10

Results - Leachate

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:					21-29503	21-29503	21-29503
Quotation No.: Q21-25050	Chemtest Sample ID.:					1266784	1266785	1266786
	Sample Location:					HP02	HP02	HP03
	Sample Type:					SOIL	SOIL	SOIL
	Top Depth (m):					0.50	1.00	0.40
	Date Sampled:					18-Aug-2021	18-Aug-2021	19-Aug-2021
Determinand	Accred.	SOP	Type	Units	LOD			
C2 Aromatic TPH >C7-C8	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10	< 0.10
C2 Aromatic TPH >C8-C10	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10	< 0.10
C2 Aromatic TPH >C10-C12	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10	< 0.10
C2 Aromatic TPH >C12-C16	N	1675	2:1	µg/l	0.10	410	420	320
C2 Aromatic TPH >C16-C21	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10	< 0.10
C2 Aromatic TPH >C21-C35	N	1675	2:1	µg/l	0.10	230	170	1500
C2 Aromatic TPH >C35-C44	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10	< 0.10
C2 Total Aromatic Hydrocarbons	N	1675	2:1	µg/l	5.0	640	590	1800
Total Petroleum Hydrocarbons	N	1675	2:1	µg/l	10	720	700	1900
Total Of 16 PAH's	N	1700	2:1	µg/l	0.20	< 0.20	< 0.20	< 0.20
Benzene	U	1760	2:1	µg/l	1.0	< 1.0	< 1.0	< 1.0
Toluene	U	1760	2:1	µg/l	1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	1760	2:1	µg/l	1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	1760	2:1	µg/l	1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	1760	2:1	µg/l	1.0	< 1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	N	1760	2:1	µg/l	1.0	< 1.0	< 1.0	< 1.0
Naphthalene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Coronene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010	< 0.010
Total Of 17 PAH's	N	1800	2:1	µg/l	0.20	< 0.20	< 0.20	< 0.20
Total Phenols	U	1920	2:1	mg/l	0.030	< 0.030	< 0.030	< 0.030

Results - Soil

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:				21-29503	21-29503	21-29503
Quotation No.: Q21-25050	Chemtest Sample ID.:				1266784	1266785	1266786
	Sample Location:				HP02	HP02	HP03
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.50	1.00	0.40
	Date Sampled:				18-Aug-2021	18-Aug-2021	19-Aug-2021
	Asbestos Lab:				DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD			
ACM Type	U	2192		N/A	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	9.2	15	7.4
Soil Colour	N	2040		N/A	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	None	Stones
Soil Texture	N	2040		N/A	Sand	Sand	Sand
pH	M	2010		4.0	9.0	8.7	8.9
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.66	< 0.40	< 0.40
Magnesium (Water Soluble)	M	2120	mg/kg	20	400	340	360
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.091	< 0.010	< 0.010
Nitrite (Extractable)	N	2220	mg/kg	0.10	0.40	< 0.10	0.16
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	< 0.010	< 0.010
Cyanide (Complex)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	0.56	0.56	0.56
Ammoniacal Nitrogen	M	2425	mg/kg	0.50	1.8	< 0.50	< 0.50
Aluminium (Total)	N	2430	mg/kg	100	11000	4200	3200
Iron (Total)	N	2430	mg/kg	100	19000	14000	13000
Sulphate (Total)	M	2430	mg/kg	100	1800	190	650
Arsenic	M	2450	mg/kg	1.0	18	9.7	18
Barium	M	2450	mg/kg	10	190	23	130
Beryllium	U	2450	mg/kg	1.0	1.2	< 1.0	< 1.0
Cadmium	M	2450	mg/kg	0.10	0.33	< 0.10	0.38
Chromium	M	2450	mg/kg	1.0	31	7.1	12
Manganese	M	2450	mg/kg	5.0	1900	400	550
Molybdenum	M	2450	mg/kg	2.0	< 2.0	< 2.0	2.1
Antimony	N	2450	mg/kg	2.0	< 2.0	< 2.0	2.0
Copper	M	2450	mg/kg	0.50	190	26	75
Mercury	M	2450	mg/kg	0.10	< 0.10	< 0.10	0.14
Nickel	M	2450	mg/kg	0.50	30	11	22
Lead	M	2450	mg/kg	0.50	53	12	110
Selenium	M	2450	mg/kg	0.20	0.76	0.20	< 0.20
Vanadium	U	2450	mg/kg	5.0	33	8.7	11
Zinc	M	2450	mg/kg	0.50	110	35	150
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	12	10	13
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010

Results - Soil

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:				21-29503	21-29503	21-29503
Quotation No.: Q21-25050	Chemtest Sample ID.:				1266784	1266785	1266786
	Sample Location:				HP02	HP02	HP03
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.50	1.00	0.40
	Date Sampled:				18-Aug-2021	18-Aug-2021	19-Aug-2021
	Asbestos Lab:				DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD			
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10	27	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10	70	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10	260	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0	350	< 1.0	< 1.0
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010	94	< 0.010	< 0.010
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Aromatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	2680	mg/kg	0.10	18	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	2680	mg/kg	0.10	280	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	2680	mg/kg	0.10	1300	< 0.10	3.9
Aromatic TPH >C21-C35	N	2680	mg/kg	0.10	3500	< 0.10	19
Aromatic TPH >C35-C44	N	2680	mg/kg	0.10	280	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	2680	mg/kg	1.0	5400	< 1.0	23
Total Petroleum Hydrocarbons	N	2680	mg/kg	2.0	5800	< 2.0	23
Benzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Toluene	M	2760	µg/kg	1.0	11	11	2.2
Ethylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
o-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Naphthalene	N	2800	mg/kg	0.010	2.7	0.68	0.52
Acenaphthylene	N	2800	mg/kg	0.010	5.1	0.22	0.24
Acenaphthene	N	2800	mg/kg	0.010	5.0	0.28	0.21
Fluorene	N	2800	mg/kg	0.010	10	0.54	0.30
Phenanthrene	N	2800	mg/kg	0.010	56	2.8	2.1
Anthracene	N	2800	mg/kg	0.010	19	0.69	0.44
Fluoranthene	N	2800	mg/kg	0.010	83	2.1	3.2
Pyrene	N	2800	mg/kg	0.010	64	1.6	2.6
Benzo[a]anthracene	N	2800	mg/kg	0.010	43	0.97	1.6
Chrysene	N	2800	mg/kg	0.010	38	0.97	1.5
Benzo[b]fluoranthene	N	2800	mg/kg	0.010	63	1.4	2.4
Benzo[k]fluoranthene	N	2800	mg/kg	0.010	25	0.47	0.71
Benzo[a]pyrene	N	2800	mg/kg	0.010	56	1.2	2.1
Indeno(1,2,3-c,d)Pyrene	N	2800	mg/kg	0.010	44	0.91	1.6
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.010	8.3	0.30	0.44

Results - Soil

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:				21-29503	21-29503	21-29503
Quotation No.: Q21-25050	Chemtest Sample ID.:				1266784	1266785	1266786
	Sample Location:				HP02	HP02	HP03
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.50	1.00	0.40
	Date Sampled:				18-Aug-2021	18-Aug-2021	19-Aug-2021
	Asbestos Lab:				DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD			
Benzo[g,h,i]perylene	N	2800	mg/kg	0.010	34	0.76	1.4
Coronene	N	2800	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Total Of 17 PAH's	N	2800	mg/kg	0.20	560	16	21
Total Phenols	M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1100	Chemical Oxygen Demand	Chemical Oxygen demand (COD)	Dichromate oxidation of organic matter in sample followed by colorimetric determination of residual Cr[VI].
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1325	Sulphide in Waters	Sulphides	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using N,N-dimethyl-pphenylenediamine.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazine.
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurement by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.

Test Methods

SOP	Title	Parameters included	Method summary
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N-dimethyl-p-phenylenediamine.
2425	Extractable Ammonium in soils	Ammonium	Extraction with potassium chloride solution / analysis by 'Aquakem 600' Discrete Analyser using sodium salicylate and sodium dichloroisocyanurate.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenzo[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge
650	Characterisation of Waste (Leaching WAC)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com



Final Report

Report No.:	21-29846-1		
Initial Date of Issue:	02-Sep-2021		
Client	Quantum Geotechnic Ltd		
Client Address:	Plas Newydd Llanedi Pontarddulais Swansea SA4 0FQ		
Contact(s):	Arwel Jones Phil Darby		
Project	Q0560 Grandison Brook		
Quotation No.:	Q21-25050	Date Received:	26-Aug-2021
Order No.:		Date Instructed:	26-Aug-2021
No. of Samples:	3		
Turnaround (Wkdays):	5	Results Due:	02-Sep-2021
Date Approved:	02-Sep-2021		
Approved By:			
Details:	Glynn Harvey, Technical Manager		

Results - Water

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:				21-29846	21-29846	21-29846
Quotation No.: Q21-25050	Chemtest Sample ID.:				1268234	1268235	1268236
	Client Sample ID.:				1	2	
	Sample Location:				Upstream	Downstream	GBBH05
	Sample Type:				WATER	WATER	WATER
	Date Sampled:				25-Aug-2021	25-Aug-2021	25-Aug-2021
Determinand	Accred.	SOP	Units	LOD			
pH	U	1010		N/A	8.5	8.5	8.3
Biochemical Oxygen Demand Low Level	N	1090	mg O2/l	1.0	< 1.0	< 1.0	< 1.0
Alkalinity (Total)	U	1220	mg/l	10	150	61	61
Chloride	U	1220	mg/l	1.0	32	20	19
Ammonia (Free)	N	1220	mg/l	0.050	0.19	< 0.050	< 0.050
Ammonium	U	1220	mg/l	0.050	1.4	0.33	0.30
Ammoniacal Nitrogen	U	1220	mg/l	0.050	1.2	0.30	0.26
Nitrate	U	1220	mg/l	0.50	11	4.4	7.8
Phosphorus (Dissolved)	U	1220	mg/l	0.020	0.065	0.024	0.023
Sulphate	U	1220	mg/l	1.0	35	19	20
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050
Sulphide	U	1325	mg/l	0.050	< 0.050	< 0.050	< 0.050
Calcium	U	1455	mg/l	2.00	46	21	21
Total Hardness as CaCO3	U	1270	mg/l	15	160	69	67
Aluminium (Dissolved)	N	1455	µg/l	5.0	< 5.0	< 5.0	< 5.0
Arsenic (Dissolved)	U	1455	µg/l	0.20	1.2	0.81	0.95
Boron (Dissolved)	U	1455	µg/l	10.0	51	24	23
Barium (Dissolved)	U	1455	µg/l	5.00	41	20	20
Beryllium (Dissolved)	U	1455	µg/l	1.00	< 1.0	< 1.0	< 1.0
Cadmium (Dissolved)	U	1455	µg/l	0.11	< 0.11	< 0.11	< 0.11
Copper (Dissolved)	U	1455	µg/l	0.50	2.6	2.8	2.5
Iron (Dissolved)	N	1455	µg/l	5.0	< 5.0	110	150
Mercury (Dissolved)	U	1455	µg/l	0.05	< 0.05	< 0.05	< 0.05
Molybdenum (Dissolved)	U	1455	µg/l	0.20	1.3	0.83	0.64
Nickel (Dissolved)	U	1455	µg/l	0.50	0.66	1.1	1.1
Lead (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50	< 0.50
Antimony (Dissolved)	U	1455	µg/l	0.50	0.56	< 0.50	< 0.50
Selenium (Dissolved)	U	1455	µg/l	0.50	2.0	< 0.50	0.56
Vanadium (Dissolved)	U	1455	µg/l	0.50	0.58	0.51	0.52
Zinc (Dissolved)	U	1455	µg/l	2.5	8.8	3.6	3.9
Chromium (Total)	N	1455	µg/l	0.50	6.6	5.8	5.7
Low-Level Chromium (Hexavalent)	U	1495	µg/l	0.10	3.7	3.3	3.0
Dissolved Organic Carbon	U	1610	mg/l	2.0	2.2	3.5	3.4
Total Organic Carbon	U	1610	mg/l	2.0	2.0	3.2	3.3
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10

Results - Water

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:				21-29846	21-29846	21-29846
Quotation No.: Q21-25050	Chemtest Sample ID.:				1268234	1268235	1268236
	Client Sample ID.:				1	2	
	Sample Location:				Upstream	Downstream	GBBH05
	Sample Type:				WATER	WATER	WATER
	Date Sampled:				25-Aug-2021	25-Aug-2021	25-Aug-2021
Determinand	Accred.	SOP	Units	LOD			
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	< 10	< 10
Benzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Toluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Naphthalene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Chrysene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Coronene	N	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Of 17 PAH's	N	1800	µg/l	2.0	< 2.0	< 2.0	< 2.0
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1090	Biochemical Oxygen Demand	Biochemical Oxygen demand (BOD)	Colorimetric determination of dissolved oxygen in seeded sample after 5 days incubation at 20°C.
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1270	Total Hardness of Waters	Total hardness	Calculation applied to calcium and magnesium results, expressed as mg l-1 CaCO3 equivalent.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1325	Sulphide in Waters	Sulphides	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using N,N-dimethyl-pphenylenediamine.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1495	Low Level Hexavalent Chromium in Waters	Chromium [VI]	Colorimetric determination of hexavalent chromium expressed as Cr (VI) µg/l in water, using Ion Chromatography and UV-visible spectrophotometry.
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com



Final Report

Report No.:	21-29847-1		
Initial Date of Issue:	02-Sep-2021		
Client	Quantum Geotechnic Ltd		
Client Address:	Plas Newydd Llanedi Pontarddulais Swansea SA4 0FQ		
Contact(s):	Arwel Jones Phil Darby		
Project	Q0560 Grandison Brook		
Quotation No.:	Q21-25050	Date Received:	26-Aug-2021
Order No.:		Date Instructed:	26-Aug-2021
No. of Samples:	1		
Turnaround (Wkdays):	5	Results Due:	02-Sep-2021
Date Approved:	02-Sep-2021		
Approved By:			
Details:	Glynn Harvey, Technical Manager		

Results - Leachate

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.: 21-29847				
Quotation No.: Q21-25050	Chemtest Sample ID.: 1268237				
	Client Sample ID.: 1				
	Sample Location: HP05				
	Sample Type: SOIL				
	Top Depth (m): 0.3				
	Date Sampled: 19-Aug-2021				
Determinand	Accred.	SOP	Type	Units	LOD
pH	U	1010	2:1		N/A 8.6
Chemical Oxygen Demand	U	1100	2:1	mg O2/l	10 31
Ammoniacal Nitrogen	U	1220	2:1	mg/l	0.050 0.093
Nitrite	U	1220	2:1	mg/l	0.020 < 0.020
Nitrate	U	1220	2:1	mg/l	0.50 15
Sulphate	U	1220	2:1	mg/l	1.0 8.8
Cyanide (Total)	U	1300	2:1	mg/l	0.050 < 0.050
Cyanide (Free)	U	1300	2:1	mg/l	0.050 < 0.050
Cyanide (Complex)	U	1300	2:1	mg/l	0.050 < 0.050
Sulphide	U	1325	2:1	mg/l	0.050 < 0.050
Magnesium	U	1455	2:1	mg/l	0.20 2.8
Aluminium (Dissolved)	N	1455	2:1	µg/l	5.0 19
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20 1.1
Boron (Dissolved)	U	1455	2:1	µg/l	10.0 20
Barium (Dissolved)	U	1455	2:1	µg/l	5.00 34
Beryllium (Dissolved)	U	1455	2:1	µg/l	1.00 < 1.0
Cadmium (Dissolved)	U	1455	2:1	µg/l	0.11 < 0.11
Copper (Dissolved)	U	1455	2:1	µg/l	0.50 5.0
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05 < 0.05
Manganese (Dissolved)	U	1455	2:1	µg/l	0.50 1.6
Molybdenum (Dissolved)	U	1455	2:1	µg/l	0.20 1.3
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50 0.75
Lead (Dissolved)	U	1455	2:1	µg/l	0.50 < 0.50
Antimony (Dissolved)	U	1455	2:1	µg/l	0.50 1.4
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50 < 0.50
Vanadium (Dissolved)	U	1455	2:1	µg/l	0.50 < 0.50
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5 < 2.5
Chromium (Total)	N	1455	2:1	µg/l	0.50 < 0.50
Iron (Dissolved)	N	1455	2:1	µg/l	5.0 53
Chromium (Hexavalent)	U	1490	2:1	µg/l	20 < 20
C2 Aliphatic TPH >C5-C6	N	1675	2:1	µg/l	0.10 < 0.10
C2 Aliphatic TPH >C6-C8	N	1675	2:1	µg/l	0.10 < 0.10
C2 Aliphatic TPH >C8-C10	N	1675	2:1	µg/l	0.10 < 0.10
C2 Aliphatic TPH >C10-C12	N	1675	2:1	µg/l	0.10 < 0.10
C2 Aliphatic TPH >C12-C16	N	1675	2:1	µg/l	0.10 < 0.10
C2 Aliphatic TPH >C16-C21	N	1675	2:1	µg/l	0.10 < 0.10
C2 Aliphatic TPH >C21-C35	N	1675	2:1	µg/l	0.10 < 0.10
C2 Aliphatic TPH >C35-C44	N	1675	2:1	µg/l	0.10 < 0.10
Total Aliphatic Hydrocarbons	N	1675	2:1	µg/l	5.0 < 5.0

Results - Leachate

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:					21-29847
Quotation No.: Q21-25050	Chemtest Sample ID.:					1268237
	Client Sample ID.:					1
	Sample Location:					HP05
	Sample Type:					SOIL
	Top Depth (m):					0.3
	Date Sampled:					19-Aug-2021
Determinand	Accred.	SOP	Type	Units	LOD	
C2 Aromatic TPH >C5-C7	N	1675	2:1	µg/l	0.10	< 0.10
C2 Aromatic TPH >C7-C8	N	1675	2:1	µg/l	0.10	< 0.10
C2 Aromatic TPH >C8-C10	N	1675	2:1	µg/l	0.10	< 0.10
C2 Aromatic TPH >C10-C12	N	1675	2:1	µg/l	0.10	< 0.10
C2 Aromatic TPH >C12-C16	N	1675	2:1	µg/l	0.10	< 0.10
C2 Aromatic TPH >C16-C21	N	1675	2:1	µg/l	0.10	< 0.10
C2 Aromatic TPH >C21-C35	N	1675	2:1	µg/l	0.10	< 0.10
C2 Aromatic TPH >C35-C44	N	1675	2:1	µg/l	0.10	< 0.10
C2 Total Aromatic Hydrocarbons	N	1675	2:1	µg/l	5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	2:1	µg/l	10	< 10
Total Of 16 PAH's	N	1700	2:1	µg/l	0.20	< 0.20
Benzene	U	1760	2:1	µg/l	1.0	< 1.0
Toluene	U	1760	2:1	µg/l	1.0	< 1.0
Ethylbenzene	U	1760	2:1	µg/l	1.0	< 1.0
m & p-Xylene	U	1760	2:1	µg/l	1.0	< 1.0
o-Xylene	U	1760	2:1	µg/l	1.0	< 1.0
Methyl Tert-Butyl Ether	N	1760	2:1	µg/l	1.0	< 1.0
Naphthalene	N	1800	2:1	µg/l	0.010	< 0.010
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010
Coronene	N	1800	2:1	µg/l	0.010	< 0.010
Total Of 17 PAH's	N	1800	2:1	µg/l	0.20	< 0.20
Total Phenols	U	1920	2:1	mg/l	0.030	< 0.030

Results - Soil

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:		21-29847		
Quotation No.: Q21-25050	Chemtest Sample ID.:		1268237		
	Client Sample ID.:		1		
	Sample Location:		HP05		
	Sample Type:		SOIL		
	Top Depth (m):		0.3		
	Date Sampled:		19-Aug-2021		
	Asbestos Lab:		DURHAM		
Determinand	Accred.	SOP	Units	LOD	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected
Moisture	N	2030	%	0.020	9.8
Soil Colour	N	2040		N/A	Brown
Other Material	N	2040		N/A	Stones and Roots
Soil Texture	N	2040		N/A	Sand
pH	M	2010		4.0	8.2
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	6.2
Magnesium (Water Soluble)	M	2120	mg/kg	20	740
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.015
Nitrite (Extractable)	N	2220	mg/kg	0.10	4.2
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010
Cyanide (Complex)	M	2300	mg/kg	0.50	< 0.50
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	1.2
Ammoniacal Nitrogen	M	2425	mg/kg	0.50	1.4
Aluminium (Total)	N	2430	mg/kg	100	6200
Iron (Total)	N	2430	mg/kg	100	18000
Sulphate (Total)	M	2430	mg/kg	100	1200
Arsenic	M	2450	mg/kg	1.0	19
Barium	M	2450	mg/kg	10	220
Beryllium	U	2450	mg/kg	1.0	< 1.0
Cadmium	M	2450	mg/kg	0.10	0.44
Chromium	M	2450	mg/kg	1.0	14
Manganese	M	2450	mg/kg	5.0	530
Molybdenum	M	2450	mg/kg	2.0	< 2.0
Antimony	N	2450	mg/kg	2.0	< 2.0
Copper	M	2450	mg/kg	0.50	35
Mercury	M	2450	mg/kg	0.10	< 0.10
Nickel	M	2450	mg/kg	0.50	19
Lead	M	2450	mg/kg	0.50	46
Selenium	M	2450	mg/kg	0.20	< 0.20
Vanadium	U	2450	mg/kg	5.0	21
Zinc	M	2450	mg/kg	0.50	100
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50

Results - Soil

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:		21-29847		
Quotation No.: Q21-25050	Chemtest Sample ID.:		1268237		
	Client Sample ID.:		1		
	Sample Location:		HP05		
	Sample Type:		SOIL		
	Top Depth (m):		0.3		
	Date Sampled:		19-Aug-2021		
	Asbestos Lab:		DURHAM		
Determinand	Accred.	SOP	Units	LOD	
Organic Matter	M	2625	%	0.40	10
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010	< 0.010
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010	< 0.010
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10	9.0
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10	3.1
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10	6.9
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10	< 0.10
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10	22
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0	41
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010	< 0.010
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010	< 0.010
Aromatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10
Aromatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10
Aromatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10
Aromatic TPH >C16-C21	N	2680	mg/kg	0.10	< 0.10
Aromatic TPH >C21-C35	N	2680	mg/kg	0.10	93
Aromatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10
Total Aromatic Hydrocarbons	N	2680	mg/kg	1.0	93
Total Petroleum Hydrocarbons	N	2680	mg/kg	2.0	130
Benzene	M	2760	µg/kg	1.0	< 1.0
Toluene	M	2760	µg/kg	1.0	< 1.0
Ethylbenzene	M	2760	µg/kg	1.0	< 1.0
m & p-Xylene	M	2760	µg/kg	1.0	< 1.0
o-Xylene	M	2760	µg/kg	1.0	< 1.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	< 1.0
Naphthalene	N	2800	mg/kg	0.010	0.12
Acenaphthylene	N	2800	mg/kg	0.010	0.14
Acenaphthene	N	2800	mg/kg	0.010	0.18
Fluorene	N	2800	mg/kg	0.010	0.13
Phenanthrene	N	2800	mg/kg	0.010	0.50
Anthracene	N	2800	mg/kg	0.010	0.19
Fluoranthene	N	2800	mg/kg	0.010	1.1
Pyrene	N	2800	mg/kg	0.010	0.85
Benzo[a]anthracene	N	2800	mg/kg	0.010	0.75
Chrysene	N	2800	mg/kg	0.010	0.64
Benzo[b]fluoranthene	N	2800	mg/kg	0.010	0.88
Benzo[k]fluoranthene	N	2800	mg/kg	0.010	0.38

Results - Soil

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:		21-29847		
Quotation No.: Q21-25050	Chemtest Sample ID.:		1268237		
	Client Sample ID.:		1		
	Sample Location:		HP05		
	Sample Type:		SOIL		
	Top Depth (m):		0.3		
	Date Sampled:		19-Aug-2021		
	Asbestos Lab:		DURHAM		
Determinand	Accred.	SOP	Units	LOD	
Benzo[a]pyrene	N	2800	mg/kg	0.010	0.55
Indeno(1,2,3-c,d)Pyrene	N	2800	mg/kg	0.010	0.32
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.010	0.13
Benzo[g,h,i]perylene	N	2800	mg/kg	0.010	0.31
Coronene	N	2800	mg/kg	0.010	< 0.010
Total Of 17 PAH's	N	2800	mg/kg	0.20	7.2
Total Phenols	M	2920	mg/kg	0.10	< 0.10

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1100	Chemical Oxygen Demand	Chemical Oxygen demand (COD)	Dichromate oxidation of organic matter in sample followed by colorimetric determination of residual Cr[VI].
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1325	Sulphide in Waters	Sulphides	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using N,N-dimethyl-pphenylenediamine.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazine.
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurement by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.

Test Methods

SOP	Title	Parameters included	Method summary
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N-dimethyl-p-phenylenediamine.
2425	Extractable Ammonium in soils	Ammonium	Extraction with potassium chloride solution / analysis by 'Aquakem 600' Discrete Analyser using sodium salicylate and sodium dichloroisocyanurate.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5-C6, >C6-C8,>C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35- C44 Aromatics: >C5-C7, >C7-C8, >C8- C10, >C10-C12, >C12-C16, >C16- C21, >C21- C35, >C35- C44	Dichloromethane extraction / GCxGC FID detection
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenzo[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and Trimethylphenols Note: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	Compliance Test for Leaching of Granular Waste Material and Sludge
650	Characterisation of Waste (Leaching WAC)	Waste material including soil, sludges and granular waste	Compliance Test for Leaching of Granular Waste Material and Sludge

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com



Final Report

Report No.:	21-40292-1		
Initial Date of Issue:	03-Dec-2021		
Client	Quantum Geotechnic Ltd		
Client Address:	Plas Newydd Llanedi Pontarddulais Swansea SA4 0FQ		
Contact(s):	Arwel Jones		
Project	Q0560 Grandison Brook		
Quotation No.:	Q21-25050	Date Received:	17-Nov-2021
Order No.:		Date Instructed:	25-Nov-2021
No. of Samples:	3		
Turnaround (Wkdays):	5	Results Due:	01-Dec-2021
Date Approved:	03-Dec-2021		
Approved By:			
Details:	Glynn Harvey, Technical Manager		

Results - Leachate

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:					21-40292	21-40292
Quotation No.: Q21-25050	Chemtest Sample ID.:					1321253	1321255
Order No.:	Client Sample Ref.:					7	1
	Sample Location:					GBTP04	GBBH04
	Sample Type:					SOIL	SOIL
	Top Depth (m):					0.5	0.5
	Date Sampled:					15-Nov-2021	15-Nov-2021
Determinand	Accred.	SOP	Type	Units	LOD		
pH	U	1010	2:1		N/A	8.8	8.5
Chemical Oxygen Demand	U	1100	2:1	mg O2/l	10	< 10	15
Ammoniacal Nitrogen	U	1220	2:1	mg/l	0.050	< 0.050	0.051
Nitrite	U	1220	2:1	mg/l	0.020	< 0.020	< 0.020
Nitrate	U	1220	2:1	mg/l	0.50	2.0	1.5
Sulphate	U	1220	2:1	mg/l	1.0	15	14
Cyanide (Total)	U	1300	2:1	mg/l	0.050	0.25	< 0.050
Cyanide (Free)	U	1300	2:1	mg/l	0.050	< 0.050	< 0.050
Cyanide (Complex)	U	1300	2:1	mg/l	0.050	0.25	< 0.050
Sulphide	U	1325	2:1	mg/l	0.050	0.074	0.054
Magnesium	U	1455	2:1	mg/l	0.20	1.5	1.4
Aluminium (Dissolved)	N	1455	2:1	µg/l	5.0	7500	7900
Arsenic (Dissolved)	U	1455	2:1	µg/l	0.20	36	8.6
Boron (Dissolved)	U	1455	2:1	µg/l	10.0	25	23
Barium (Dissolved)	U	1455	2:1	µg/l	5.00	55	25
Beryllium (Dissolved)	U	1455	2:1	µg/l	1.00	< 1.0	< 1.0
Cadmium (Dissolved)	U	1455	2:1	µg/l	0.11	0.13	< 0.11
Copper (Dissolved)	U	1455	2:1	µg/l	0.50	110	20
Mercury (Dissolved)	U	1455	2:1	µg/l	0.05	0.42	< 0.05
Manganese (Dissolved)	U	1455	2:1	µg/l	0.50	96	18
Molybdenum (Dissolved)	U	1455	2:1	µg/l	0.20	7.3	2.5
Nickel (Dissolved)	U	1455	2:1	µg/l	0.50	13	4.5
Lead (Dissolved)	U	1455	2:1	µg/l	0.50	93	11
Antimony (Dissolved)	U	1455	2:1	µg/l	0.50	8.3	1.5
Selenium (Dissolved)	U	1455	2:1	µg/l	0.50	1.8	< 0.50
Vanadium (Dissolved)	U	1455	2:1	µg/l	0.50	24	20
Zinc (Dissolved)	U	1455	2:1	µg/l	2.5	82	29
Chromium (Total)	N	1455	2:1	µg/l	0.50	25	13
Iron (Dissolved)	N	1455	2:1	µg/l	5.0	12000	6300
Chromium (Hexavalent)	U	1490	2:1	µg/l	20	22	< 20
C2 Aliphatic TPH >C5-C6	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
C2 Aliphatic TPH >C6-C8	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
C2 Aliphatic TPH >C8-C10	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
C2 Aliphatic TPH >C10-C12	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
C2 Aliphatic TPH >C12-C16	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
C2 Aliphatic TPH >C16-C21	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
C2 Aliphatic TPH >C21-C35	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
C2 Aliphatic TPH >C35-C44	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	2:1	µg/l	5.0	< 5.0	< 5.0

Results - Leachate

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:					21-40292	21-40292
Quotation No.: Q21-25050	Chemtest Sample ID.:					1321253	1321255
Order No.:	Client Sample Ref.:					7	1
	Sample Location:					GBTP04	GBBH04
	Sample Type:					SOIL	SOIL
	Top Depth (m):					0.5	0.5
	Date Sampled:					15-Nov-2021	15-Nov-2021
Determinand	Accred.	SOP	Type	Units	LOD		
C2 Aromatic TPH >C5-C7	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
C2 Aromatic TPH >C7-C8	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
C2 Aromatic TPH >C8-C10	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
C2 Aromatic TPH >C10-C12	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
C2 Aromatic TPH >C12-C16	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
C2 Aromatic TPH >C16-C21	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
C2 Aromatic TPH >C21-C35	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
C2 Aromatic TPH >C35-C44	N	1675	2:1	µg/l	0.10	< 0.10	< 0.10
C2 Total Aromatic Hydrocarbons	N	1675	2:1	µg/l	5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	2:1	µg/l	10	< 10	< 10
Total Of 16 PAH's	N	1700	2:1	µg/l	0.20	< 0.20	< 0.20
Benzene	U	1760	2:1	µg/l	1.0	< 1.0	< 1.0
Toluene	U	1760	2:1	µg/l	1.0	< 1.0	< 1.0
Ethylbenzene	U	1760	2:1	µg/l	1.0	< 1.0	< 1.0
m & p-Xylene	U	1760	2:1	µg/l	1.0	< 1.0	< 1.0
o-Xylene	U	1760	2:1	µg/l	1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	N	1760	2:1	µg/l	1.0	< 1.0	< 1.0
Naphthalene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Acenaphthylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Acenaphthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Fluorene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Phenanthrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Chrysene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Coronene	N	1800	2:1	µg/l	0.010	< 0.010	< 0.010
Total Of 17 PAH's	N	1800	2:1	µg/l	0.20	< 0.20	< 0.20
Total Phenols	U	1920	2:1	mg/l	0.030	< 0.030	< 0.030

Results - Soil

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:				21-40292	21-40292	21-40292
Quotation No.: Q21-25050	Chemtest Sample ID.:				1321253	1321254	1321255
Order No.:	Client Sample Ref.:				7	2	1
	Sample Location:				GBTP04	GBTP04	GBBH04
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.5	1.0	0.5
	Date Sampled:				15-Nov-2021	15-Nov-2021	15-Nov-2021
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD			
ACM Type	U	2192		N/A	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	24	38	25
Soil Colour	N	2040		N/A	Brown	Brown	Grey
Other Material	N	2040		N/A	Stones and Roots	Stones	Stones, Roots and Wood
Soil Texture	N	2040		N/A	Sand	Clay	Clay
pH	M	2010		4.0	7.1	7.0	7.0
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.68	3.2	0.51
Magnesium (Water Soluble)	M	2120	mg/kg	20	< 20	< 20	< 20
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	< 0.010	< 0.010	< 0.010
Nitrite (Extractable)	N	2220	mg/kg	0.10	0.19	0.20	0.28
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	< 0.010	< 0.010
Cyanide (Complex)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Cyanide (Free)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	2.1	34	1.9
Ammoniacal Nitrogen	M	2425	mg/kg	0.50	4.4	22	6.5
Aluminium (Total)	N	2430	mg/kg	100	12000	10000	12000
Iron (Total)	N	2430	mg/kg	100	22000	18000	19000
Sulphate (Total)	U	2430	mg/kg	100	1300	1500	990
Arsenic	M	2450	mg/kg	1.0	51	9.8	17
Barium	M	2450	mg/kg	10	150	23	40
Beryllium	U	2450	mg/kg	1.0	1.3	< 1.0	< 1.0
Cadmium	M	2450	mg/kg	0.10	0.46	< 0.10	< 0.10
Chromium	M	2450	mg/kg	1.0	26	28	31
Manganese	M	2450	mg/kg	5.0	390	150	160
Molybdenum	M	2450	mg/kg	2.0	4.3	< 2.0	2.1
Antimony	N	2450	mg/kg	2.0	9.6	< 2.0	< 2.0
Copper	M	2450	mg/kg	0.50	250	110	54
Mercury	M	2450	mg/kg	0.10	0.57	< 0.10	< 0.10
Nickel	M	2450	mg/kg	0.50	35	21	19
Lead	M	2450	mg/kg	0.50	200	29	40
Selenium	M	2450	mg/kg	0.20	1.4	< 0.20	0.33
Vanadium	U	2450	mg/kg	5.0	41	39	43
Zinc	M	2450	mg/kg	0.50	170	68	66
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50

Results - Soil

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:				21-40292	21-40292	21-40292
Quotation No.: Q21-25050	Chemtest Sample ID.:				1321253	1321254	1321255
Order No.:	Client Sample Ref.:				7	2	1
	Sample Location:				GBTP04	GBTP04	GBBH04
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.5	1.0	0.5
	Date Sampled:				15-Nov-2021	15-Nov-2021	15-Nov-2021
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD			
Organic Matter	M	2625	%	0.40	17	4.8	3.8
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Aromatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	2.0	< 2.0	< 2.0	< 2.0
Benzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Toluene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
o-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Naphthalene	N	2800	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	2800	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	N	2800	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Fluorene	N	2800	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	N	2800	mg/kg	0.010	< 0.010	1.1	< 0.010
Anthracene	N	2800	mg/kg	0.010	< 0.010	0.33	< 0.010
Fluoranthene	N	2800	mg/kg	0.010	< 0.010	3.1	0.16
Pyrene	N	2800	mg/kg	0.010	< 0.010	2.5	0.15
Benzo[a]anthracene	N	2800	mg/kg	0.010	< 0.010	1.7	0.087
Chrysene	N	2800	mg/kg	0.010	< 0.010	1.9	0.044
Benzo[b]fluoranthene	N	2800	mg/kg	0.010	< 0.010	2.5	< 0.010
Benzo[k]fluoranthene	N	2800	mg/kg	0.010	< 0.010	0.94	< 0.010

Results - Soil

Project: Q0560 Grandison Brook

Client: Quantum Geotechnic Ltd	Chemtest Job No.:				21-40292	21-40292	21-40292
Quotation No.: Q21-25050	Chemtest Sample ID.:				1321253	1321254	1321255
Order No.:	Client Sample Ref.:				7	2	1
	Sample Location:				GBTP04	GBTP04	GBBH04
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				0.5	1.0	0.5
	Date Sampled:				15-Nov-2021	15-Nov-2021	15-Nov-2021
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD			
Benzo[a]pyrene	N	2800	mg/kg	0.010	< 0.010	1.5	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	2800	mg/kg	0.010	< 0.010	1.4	< 0.010
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.010	< 0.010	0.33	< 0.010
Benzo[g,h,i]perylene	N	2800	mg/kg	0.010	< 0.010	1.2	< 0.010
Coronene	N	2800	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Total Of 17 PAH's	N	2800	mg/kg	0.20	< 0.20	19	0.44
Total Phenols	M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1100	Chemical Oxygen Demand	Chemical Oxygen demand (COD)	Dichromate oxidation of organic matter in sample followed by colorimetric determination of residual Cr[VI].
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1325	Sulphide in Waters	Sulphides	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using N,N-dimethyl-pphenylenediamine.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazine.
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurement by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.

Test Methods

SOP	Title	Parameters included	Method summary
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N-dimethyl-p-phenylenediamine.
2425	Extractable Ammonium in soils	Ammonium	Extraction with potassium chloride solution / analysis by 'Aquakem 600' Discrete Analyser using sodium salicylate and sodium dichloroisocyanurate.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44 Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenzo[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and Trimethylphenols Note: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	Compliance Test for Leaching of Granular Waste Material and Sludge
650	Characterisation of Waste (Leaching WAC)	Waste material including soil, sludges and granular waste	Compliance Test for Leaching of Granular Waste Material and Sludge

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

APPENDIX VIII – GAS AND GROUNDWATER MONITORING RECORDS

Page 1 of 1

Installation Date:				
GL (mAOD)	Pipe	Type	Installation Depth (mbgl)	Response Zone (mbgl)
5.79	A	50mm	4.00	3.0-4.0

[illegible]

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Installation Date:				
GL (mAOD)	Pipe	Type	Installation Depth (mbgl)	Response Zone (mbgl)
4.99	A	50mm	8.00	1.0-8.0

[illegible]